ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT
1982
NORTON SOUND-PORT CLARENCE-KOTZEBUE

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Preface

This report presents the bulk of current and historical information available concerning management of the commercial and subsistence fisheries of the Norton Sound, Port Clarence and Kotzebue districts. Data from many special management and research projects are included in this report, but complete documentation of these project results will be presented in separate reports.

Data presented in this report supercedes information found in previous management reports. An attempt has been made to correct errors presented in previous reports. Previously unrecorded data have been incorporated into this report and are indicated by appropriate footnotes. Current year catch data presented has been derived from preliminary field data.

This report is organized into the following major sections:

(1) Salmon
(2) Herring
(3) Shellfish
(4) Miscellaneous species

In order to facilitate use of this report, tabular data has been separated into two categories: 1) current year tables; 2) appendix tables which present annual comparision. The text for each major section is followed by current year tables and then by appendix tables.

Section 1

SALMON
(Includes Norton Sound, Port Clarence
and Kotzebue districts)

Section 1 SALMON

INTRODUCTION

Boundaries

The Norton Sound-Port Clarence-Kotzebue management districts include all waters from Canal Point Light in southern Norton Sound to Point Hope and includes St. Lawrence Island. These management districts comprise over 65,000 square miles with a coast line exceeding that of California, Oregon and Washington combined.

Salmon resource

All five species of Pacific salmon are indigenous to the area with chum (Oncorhynchus keta) and pink salmon (O. gorbuscha) being the most abundant. Chum, pink and chinook ("king") salmon (O. tschawytscha) have been found as far north as Barrow, however these species are uncommon north of the Kotzebue Sound drainages. The northernmost large concentrations of chum salmon are found within the Kotzebue Sound drainages, while large numbers of pink, chinook and coho (O. kisutch) salmon are not found north of Norton Sound. Small sockeye ("red") salmon (O. nerka) populations exist within Seward Peninsula drainages and in Kelly Lake on the Noatak River near Kotzebue.

Commercial Fishery

In 1959 and 1960, Department biologists conducted resource inventories which indicated harvestable surpluses of salmon available in several areas. The Department liberalized various regulations and encouraged processors to explore and develop new fishing grounds. As a result, commercial salmon fishing activity has grown significantly since statehood, enabling many local residents to obtain a cash income.

The majority of commercial fishermen and processing plant workers are resident Eskimos. Commercial fishermen operate set gill nets from outboard powered skiffs to capture salmon. All commercial salmon fishing is done in coastal marine waters.

Salmon effort and catch per unit effort data (CPUE) presented throughout this section, have been derived as follows. Boat (or fisherman) hours have been computed after arbitrarily assuming that if a fishing boat delivers in any fishing period, it fished the entire period.

The total number of individual boats delivering in any period is multiplied by the number of hours open to commercial fishing. Catch per fisherman (or boat) hour is obtained by dividing the total fishermen hours into the catch for the corresponding period of time. Total "fisherman (or boats) is the total number of fishermen making deliveries, regardless of how many deliveries were made or days fished during a particular period or season. There are a number of fishermen who deliver only once or twice during the entire season. Total days fished is the total number of hours open to commercial fishing during the season divided by 24 hours.

Subsistence Fishery

There are approximately 13,000 people in the area, the majority of which are Eskimos, residing in more than 26 small villages scattered along the coast and the major river systems. Nearly all of the native people are dependent to varying degrees on the fish and game resources for their livelihood.

Subsistence fishermen operate gill nets or seines in the main rivers and, to a lesser extent, in the coastal marine waters capturing primarily salmon, whitefish, arctic char and inconnu ("sheefish"). Beach seines are occasionally used near the spawning grounds to catch schooling or spawning salmon and other species of fish. The major portion of fish taken during the summer months is sun dried or smoked for later consumption by villagers or their dogs.

Subsistence catch information has been derived from interviews of subsistence fishermen, actual counts of subsistence fish and subsistence catch forms distributed to fishermen. Subsistence salmon catches in the Nome subdistrict (subdistrict 1) have been determined from the return of catch forms as required under a permit system.

The Department has conducted annual surveys of the important subsistence salmon fisheries since the early 1960's. The majority of salmon taken are pinks and chums. Subsistence harvest information prior to 1960 is incomplete or entirely lacking for many years. The current 5 year average in Norton Sound is 63,000 salmon while in the Kotzebue area the average is 13,000 salmon. These estimates are primarily based on village household surveys. Since not all fishermen are contacted, these estimates should be considered minimum figures.

Management

The Division of Commercial Fisheries of the Alaska Department of Fish and Game is responsible for the management of commercial and subsis-

tence fisheries in this vast area. The permanent fulltime staff assigned to this area during 1982 consisted of two management biologists stationed in Nome, a research and a management biologist stationed in Kotzebue and a clerk typist assigned to both the Nome and Kotzebue field offices. In addition, 20 summer employees were hired to assist in conducting various management and research studies.

The main objective of the Department's program is to manage the commercial salmon fishing on a sustained yield basis. Various field projects are conducted to provide information on salmon abundance and migration. Summaries of these projects are presented in Addendum 2.

Management of the salmon fishery is complicated by the difficulty in obtaining valid escapement data in this large area and by insufficient comparative catch and return information. Management problems are compounded by the need to provide not only for adequate escapements, but for the needs of several different user groups. Past Alaska Department of Fish and Game policy has been to provide for subsistence as the primary beneficial use of the fishery resource. This policy is now State law. If the subsistence harvest or demands increase commercial fishing may be restricted. It should be pointed out that increases in commercial fishing efficiency are expected and may balance any immediate decline in subsistence utilization or increase in run size with the result that present regulations will be maintained or made even more restrictive.

The basic regulation that governs the commercial salmon harvest in all districts is the scheduled weekly fishing period. Commercial fishing is allowed for a total of two to four days a week during the open season depending on area and season. Fishing effort usually occurs during the entire run and not just during a particular segment of the run. Occasionally, fishing time is increased or decreased by emergency order, depending upon fishing conditions and the strength of the runs or spawning escapements, as determined by special studies conducted by the Department. Emergency orders announced during 1982 are presented in Addendum .

Weekly fishery reports which give information on fishery status and fishing schedules, are broadcast during the fishing season over radio KICY and KNOM in Nome and KOTZ in Kotzebue. In addition, fishery news articles are published in the Bering Straights and Nome Nugget.

Norton Sound District

The Norton Sound district includes all waters from Canal Point Light north to Cape Douglas. This district is subdivided into six

subdistricts: Nome (subdistrict 1), from Penny River to Topkok Head; Golovin Bay (subdistrict 2), from Rocky Point to Cape Darby; Moses Point (subdistrict 3), from Elim Point to Kwik River; Norton Bay (sub district 4), from Kuiktulik River to Island Point; Shaktoolik (subdistrict 5), from Cape Denbigh to Junction Creek; and Unalakleet (subdistrict 6), from Junction Creek to Black Point (Figure 1).

Each of these subdistricts contain at least one major salmon spawning stream. The majority of the fishing effort occurs in the ocean near stream mouths. Subdistrict boundaries were established around the major producing local streams in an attempt to minimize interception of stocks bound for other areas.

Commercial fishery

Commercial salmon fishing in this district first began in the Unalakleet and Shaktoolik subdistricts in 1961. Most of the early interest involved chinook and coho salmon which were flown in dressed condition to Anchorage for further processing. A single American freezership also purchased and processed chum and pink salmon during 1961. In 1962, two floating cannery ships operated in the district and the commercial fishery was extended into the Norton Bay, Moses Point and Golovin Bay subdistricts. The peak in salmon canning operations occurred during 1963. Current salmon processing operations freeze or ice their product for later shipment. Until recent years, insufficient tendering and processing facilities had resulted in sporadic fishing efforts; however, improvements in processing facilities have occured recently which has helped stabilize the fishery.

The commercial salmon fishing season opens by emergency order between June 8 and June 20, depending on run timing. The season normally ends when the processors terminate their operations, which is usually sometime in August. In any event, the commercial salmon season closes by regulation on August 31. Two 48-hour fishing periods normally occur each week unless fishing time is increased/decreased by emergency order.

Commercial fishing gear is restricted to set gill nets, with a maximum aggregate length of 100 fathoms allowed for each fisherman. There are no mesh or depth restrictions during the normally scheduled periods. The majority of the gill nets fished are approximately 5 1/2-inch stretched measure, but 4 1/2inch mesh nets are being used also. In the Unalakleet and Shaktoolik subdistricts, 8 1/2inch stretched mesh gill nets are commonly used during the chinook salmon run in June through

early July. During years when large pink salmon runs occur the department provides fishing periods when only 4 1/2inch mesh nets or less may be fished. These "pink salmon periods" are an attempt to harvest the abundant pink salmon without overharvesting the other larger sized species. Open skiffs of about 15 to 20 feet in length are operated by commercial fishermen.

Most fishermen do not tend their nets continuously once they are set in operation, leaving their nets in the water unattended overnight. Fish quality suffers due to the length of time fish may be left in the nets and is especially poor when storms prevent fishermen from checking their gear for extended periods of time.

The Norton Sound district is managed on the basis of comparative commercial catch data, escapements and weather conditions. A single factor or combination of factors may result in issuance of emergency orders affecting seasons, fishing periods, mesh size, and areas.

Aerial surveys and counting towers are used to monitor escapements in the majority of the Norton Sound streams. A sonar salmon counter was also operated for the first time in the Unalakleet River. Limiting factors such as weather conditions, time of day, type of aircraft, water conditions, bottom conditions, date of survey and efficiency of the surveyor must be taken into account when evaluating aerial surveys.

District Summary 1982

Commercial Fishery

A total of 164 commercial fishermen harvested 5892 chinook, 10 sockeye, 91,690 coho, 230,281 pink and 183,335 chum salmon totaling 511,208 fish. (Table 1). This was the second largest catch on record and was 1.3 times the recent 5-year average annual harvest of 405,149 salmon (Appendix table 8). The 1982 coho salmon catch was the largest on record with the pink salmon catch being the third largest.

The average weight, in pounds, for chinook, coho, pink, and chum was 16.5, 7.1, 2.9, and 7.3, respectively. (Appendix Table 9).

Fishermen received an average of $1.25, $.57, $.12, and $.32 per pound for chinook, coho, pink and chum salmon, respectively. The chinook salmon price was the highest ever paid in the district. Approximately $989,000 was paid to fishermen for their 1982 catches. This is the most money ever paid to the fishermen in this District. (Appendix Tables 10 and 11).

Eight salmon processors operated in Norton Sound in 1982 (Addendum 4). These processors purchases approximately 2,743,426 pounds of salmon (Appendix Table 12).

Subsistence Fishery

A total of 320 subsistence fishermen interviewed reported catching 1,328 chinook, 17,874 coho, 56,295 pink, 23,185 chum and 8 sockeye salmon for a total harvest of 98,690 fish (Table 2). This catch was 1.6 times the recent 5-year annual average harvest and the largest ever documented (Appendix Table 8). Subsistence harvest data was tabulated from subsistence permits in the Nome subdistrict and from door to door surveys conducted in other Norton Sound villages. Because all subsistence fishermen were not interviewed these figures should be considered as minimum estimates.

Escapement

Aerial and boat survey counts conducted in the Nome subdistrict indicated that chum salmon escapement was below average. Tower counts in the Moses Pt. subdistrict indicated the second largest chum escapement on record for this subdistrict. Aerial survey counts of chum salmon in the Golovin subdistrict were hampered by the large numbers of pink salmon; however, comparative commercial catch statistics indicated above average escapement. Aerial surveys were hampered by poor weather conditions in the Norton Bay, Shaktoolik, and Unalakleet subdistricts; however, comparative catch statistics indicated average chum escapement.

Pink salmon escapement was excellent throughout Norton Sound. Pink salmon escapement of over 7 1/2 million salmon was documented using aerial surveys as well as sonar and tower counts. Since not all streams were surveyed and not all fish were counted during surveys, pink salmon escapement may have been as high as 10 million fish.

Although no aerial surveys were flown during the coho season, comparative catch statistics indicated record escapement in Norton Sound.

Nome (Subdistrict 1)

Commercial Fishery

Eighteen commercial fishermen caught 20 chinook, 10 sockeye, 1,183 coho, 18,512 pink, and 13,447 chum salmon for a total harvest of 33,162 salmon (Table 5 , Appendix Table 2). This is the largest total catch on record for this subdistrict. The catch was purchased by two buyers. Fish were iced and flown in the round to processors in other areas or were marketed as fresh/frozen fish in Nome.

The coho, pink, and chum catches were the 1st, 2nd, and 4th largest catches on record respectively. Comparative commercial catch data is presented in Appendix Table 2 .

Generally, chum salmon have been less abundant than pink salmon in subdistrict 1 streams but the commercial fishery has targeted this species. Strong chum salmon catches in relation to local stock abundance has implied the presence of a "cape" or interception fishery situation. Data from a recent Norton Sound stock separation study tends to confirm this view. Salmon tagged near Nome were captured in fisheries from Golovin (subdistrict 2) to Kotzebue. Nome subdistrict streams are also heavily utilized by subsistence fishermen, with over 200 people receiving permits in 1982 reporting a catch of approximately 14,000 salmon. For these reasons a conservative commercial guideline harvest of 5,000-15,000 chum salmon has been instituted as a management strategy for this subdistrict. The Alaska Board of Fisheries adopted this harvest guideline as a permanent regulation in 1981.

The commercial salmon season opened by emergency order on June 17 with the first commercial landings also occurring on this date. Due to poor escapement and the large harvest of 10,970 chum salmon, the Nome subdistrict was closed to commercial salmon fishing on June 29. Due to the large pink salmon run, commercial salmon fishing was re-opened on July 5, but with a mesh restriction of 4 1/2 inches or less. The mesh restriction was imposed in an effort to harvest pink salmon without overharvesting chum salmon stocks. During the first open "pink gear" period, 14 fishermen harvested over 17,000 pink salmon and only about 1,700 chum salmon. However, by July 10, there was no longer a market for pink salmon, so fishing effort decreased from 14 fishermen to only 1 fisherman. On August 1 the mesh restriction was lifted and commercial fishermen were allowed by regulation to fish 2 days a week in order to harvest a portion of the coho salmon run.

Subsistence Fishing

Due to increased access, effort and limited chum and coho salmon stocks in local streams, subsistence fishing has been conducted on a permit system since 1974. The permit system documents the actual subsistence harvest because fishermen record the number of fish they take on the permit and return it at the end of the season. The permit system also distributes fishing effort. Each Nome area river has a limit of fish that each family can harvest. Once that catch limit has been reached a permit can be obtained for a different river. There is no catch limit in ocean waters.

Two hundred thirteen subsistence permits were issued for the Nome subdistrict in 1982 compared to 216 in 1981. Results from the 178 permits returned indicated a reported harvest of 21 chinook, 6 sockeye, 1,829 coho, 19,202 pink and 4,831 chum salmon for a total of 25,889 fish (Table 3, Appendix Table 2). This is the second largest catch ever documented in this subdistrict.

During the commercial salmon season, subsistence fishing was allowed 4 days per week, except from July 17 to August 7 when it was opened to 7 days a week due to the strong pink run. Permit renewals were allowed for the same stream during the pink run.

Escapement

Aerial and boat surveys made during the pink and chum runs documented excellent pink but poor chum salmon escapement. Peak escapement counts of 7,902 chum and 738,700 pink salmon were made from 7 index streams (Table 4). Escapement surveys were not flown during the coho season due to poor weather.

Golovin Bay (Subdistrict 2)

Commercial Fishery

Seventeen fishermen harvested 78 chinook, 5 sockeye, 4,281 coho, 39,510 pink and 51,970 chum salmon for a total harvest of 95,844 fish (Table 6). The total catch and the coho catch were the third largest and the largest ever recorded respectively. (Appendix Table 3). The catch was purchased in Golovin by a fishermen's cooperative, dressed, frozen and transported from the District via freezerboat.

The commercial salmon season opened on June 17 with deliveries made the same day. Golovin subdistrict fishermen fished 4 days per week throughout the season. In addition, several pink gear only periods were provided, but no one fished. This lack of effort was due to periodic Co-op freezer plant breakdowns and lack of fishermen interest.

For the first time, the Golovin Co-op stayed open throughout August to buy coho salmon. An average of 5 fishermen fished for coho. Efforts were hampered by stormy weather in the first half of August.

Subsistence Fishing

Commercial fishermen in Golovin Bay often retain a portion of their catch for subsistence purposes. Several Golovin residents maintain subsistence fishing camps along the Kachavik River. Subsistence fishing within the Niukluk and Fish Rivers is done by residents of White Mountain and Council.

Thirty-four subsistence fishermen from Golovin, White Mountain, and Council reported catching 7 chinook, 1,321 coho, 4,752 pink and 1,869 chum salmon for a total harvest of 7,949 salmon (Table 2 , Appendix Table 3).

Escapement

The major salmon spawning areas in subdistrict 2 are the Fish and Niukluk Rivers. The large numbers of pink salmon present made the enumeration of other species difficult. A pink salmon escapement of over 469,000 fish was documented in the Fish and Niukluk systems (Table 4). The chum count of only 2,300 can be considered very low due to the pink salmon "masking" problem. Comparative catch statistics indicated an above average chum run and therefore escapement was probably also above average.

Moses Point (Subdistrict 3)

Commercial Fishing

Twenty-eight fishermen harvested 253 chinook, 318 coho, 9,849 pink, and 40,030 chum salmon (Table 7). Fishing effort was second lowest on record for the past ten years (Appendix Table 1). This drop in effort is partially explained by the poor chum runs which have been experienced or anticipated in this subdistrict since 1976. The 1982 total chum run was surprisingly strong and, despite low fishing effort, the chum catch was above average. (Appendix Table 4).

Since 1980 this subdistrict has had its fishing schedule established by emergency order in order to achieve the minimum escapement goal of 20,000 chum in the Kwiniuk River where the department has operated a counting tower since 1965. Due to an expected low chum salmon return to this subdistrict based on poor brood year escapement (1977-1979), commercial fishing began on June 17 on a reduced schedule of two 24 hour periods per week. However, by June 27 the department counting tower crew had counted over 11,000 chum salmon. Since it was apparent that an average escapement of 25,000 chum would occur even with increased fishing time, the periods were increased to one 2 day and one 3 day period a week. By July 5, 21,361 chum salmon had been counted on the Kwiniuk River, so fishing time was again increased to one 6 day period a week.

This subdistrict experienced a record pink salmon run. Once again, the Moses Point subdistrict was without a constant market for their pink salmon. During the peak of the pink run, several fishermen stripped and sold pink salmon roe, and hung the carcasses to dry for home use. A total of 95 pounds of pink salmon roe worth $1.00 per pound was sold. The main buyer in this subdistrict was the Elim Fishermen's Co-op which gutted, headed, and iced the salmon, and flew them to Golovin to be frozen. Although the Co-op intended to remain open during the entire coho season, only 3 fishermen were still fishing by August 3. The last

delivery was made on August 11.

Subsistence Fishing

Twenty-five fishermen reported taking 1 chinook, 1,835 coho, 3,785 pink and 3,537 chum salmon for a total of 9,158 fish (Table 2 , Appendix Table 4). This catch is 1.4 times the recent 5 year average.

Escapement

The Kwiniuk and Tubutulik Rivers are the main spawning grounds for fish entering this subdistrict. A total of 138 chinook, and an expanded total of 469,674 pink and 44,099 chum salmon passed the Kwiniuk tower. Both the chum and pink escapements were the second largest on record. Aerial surveys flown on the Tubutulik River under fair conditions documented 53,530 pink and 2,044 chum salmon.

Norton Bay (Subdistrict 4)

Commercial Fishing

Ten commercial fishermen caught 96 chinook, 2,332 coho, 2,535 pink, and 7,128 chum salmon.(Table 8) Fishing effort was less than half the 5 year average with the commercial catch being 28% and 10% below the recent 5 and 10 year average, respectively. This subdistrict was without a buyer for a large part of the season resulting in the low effort and catch. Most fish were caught off the mouth of the Ungalik River and were flown or tendered by boat to Unalakleet where they were flown from the district. Stormy weather or rough seas hampered these operations resulting in just 15 of 30 open periods being fished. Due to lack of a pink market and sporadic tendering operations, Norton Bay fishermen did not fish any of the pink gear periods provided.

Subsistence Fishing

Most subsistence fishing activities occur near the Ungalik River, although limited fishing takes place near the Inglutalik and Koyuk Rivers.

Sixteen fishermen from Koyuk reported taking 1 chinook, 484 coho, 2,600 pink and 2,485 chum salmon for a total of 5,570 fish (Table 2 , Appendix Table 5). This catch is about 1.5 times the recent 5 year average.

Escapement

Aerial surveys were limited in this subdistrict due to poor weather. A survey flown on the Ungalik River documented 290 chum and 37,650 pink salmon.

Shaktoolik (Subdistrict 5)

Commercial Fishing

Thirty-two fishermen caught 1,677 chinook, 3 sockeye, 22,233 coho, 17,019 pink, 26,240 chum salmon for a total catch of 67,172 fish (Table 9). This catch was 24% above the 5 year average. Comparative commercial catch data is presented in Appendix Table 6.

Two processors operated in Shaktoolik during 1982, with at least one buyer present during all regular periods. One buyer tendered the salmon by boat or plane to the Norton Sound Fishermen's Co-op for processing. The other buyer tendered by boat to Unalakleet, iced the salmon, and flew them out of Unalakleet.

The commercial season was not opened by emergency order until June 17 because the timing of the chinook run was late. The initial period was a 24 hour test period, but periods were increased to the normal schedule of two 48 hour periods per week on June 21 as the chinook run increased in strength. Effort was higher than normal due to 7 Unalakleet fishermen who fished just north of the Shaktoolik-Unalakleet subdistrict boundary during the coho salmon run. The chum catch was about average while the coho catch was the highest on record for this subdistrict. Several pink gear periods were provided, but no one fished due to the lack of a market for the pink salmon.

Subsistence Fishing

Most of the catch is made from the Shaktoolik River, although some fish camps are maintained near Cape Denbigh.

Twenty-two fishermen reported taking 68 chinook, 2,138 coho, 3,865 pink and 1,165 chum salmon for a total of 7,236 fish (Table 2). This catch is 1.4 times the recent 5 year average.

Escapement

Aerial surveys were rained out during peak spawning periods; however, one survey flown under poor conditions documented 48 chum and 36,500 pink salmon in the Shaktoolik River. Comparative catch statistics indicate that excellent coho escapement occurred, while chum escapement probably was average.

Unalakleet (Subdistrict 6)

Commercial Fishing

A total of 68 fishermen caught 3,768 chinook, 2 sockeye, 61,343 coho, 142,856 pink, and 44,520 chum totaling 252,489 salmon (Table 10). The pink and chum salmon harvests were above the five year average with the coho catch the largest on record. The king catch was slightly below the 5 year average. A total of 4 processors bought salmon in Unalakleet, with two buyers buying fish through the end of the regular season.

The commercial season was not opened by emergency order until June 17 because the chinook run was late. The initial period was a 24 hours test period. Periods were increased to the normal schedule of two 48 hour periods per week on June 21 as the chinook run increased in strength. In addition to the regular fishing periods, this subdistrict was provided with pink gear only periods during the strong pink salmon run. This added 36 hours of fishing time per week between July 7 and July 29. Fishing effort was fairly good during these periods, and overall fishing effort was high throughout the entire season. This subdistrict as well as the Shaktoolik and Norton Bay subdistrict were given a 48 hour period extension on September 2 to harvest more of the continuing strong coho salmon run. During this period, 13 fishermen in subdistrict 6 harvested 2,366 coho salmon. The commercial season closed by emergency order on September 4.

Subsistence Fishing

Sixty-three subsistence fishermen reported taking 913 chinook, 2 sockeye, 7,037 coho, 20,045 pink, and 44694 chum (Table 2). Most of the fish taken are from the Unalakleet River, although some are taken from ocean waters and the Egavik River. This total harvest of 32,691 salmon is about 1.7 times the recent 5 year average (Appendix Table 7).

Escapement

Aerial surveys were limited in this subdistrict by poor weather conditions and muddy water. However, based on comparative catch statistics, the results of the test net operated in the main Unalakleet River, and a sonar salmon counter, pink and coho escapement was excellent with chum escapement being average.

A sonar/counting tower project was inititated in the Unalakleet River during the 1982 season. A total of 7,500 king, 5,744,000 pink, 195,000 chum and 65,000 coho salmon were counted. These counts are

preliminary and still subject to change based on further analysis of the test net and sonar data. Total sonar fish counts are divided by species based on catches in test gillnets which are operated in conjunction with the sonar counter. Due to the large numbers of pink salmon, whose run timing overlaps with king and chum run timing, even small errors or biases in test gillnet catches will result in large errors in species counts. For this reason king and chum salmon counts are more likely to be in greater error than coho counts. The coho run occurs in August after the pink run. Pink salmon counts are also less subject to error because their large numbers will not be affected by the relatively smaller numbers of king and chum.

Norton Sound District Outlook for 1983

Insufficient data ia available to enable accepted forecasting methods to be employed in Norton Sound. The 1983 "Outlook" is based upon analysis of comparative commercial catch and escapement information, age data and "subjective determinations". The "Outlook" is presented only as an indicator of possible 1983 run strength.

The pink salmon return will be produced from the 1981 brood year. Pink salmon escapements in 1981 were excellent in Norton Sound index streams with the exception of the Nome and Shaktoolik subdistricts. Therefore, overall 1983 pink salmon returns should be strong.

The 1983 Norton Sound chum salmon return will be produced by progeny of the 1978-1980 escapements, with the bulk of the run being composed of the four-year-old age class from the 1979 escapement. In 1979 chum escapement was below average in the Nome, Golovin, and Moses Point subdistricts and average in the Norton Bay, Shaktoolik, and Unalakleet subdistricts. The overall 1983 chum returns may therefore be similiar to these brood year magnitudes.

The 1983 coho run will be produced by the progeny of the 1979 escapement. Coho escapements were not documented by aerial surveys; however, commercial and subsistence catches were six times greater than the previous five year average. This indicates escapement was well above average and therefore the 1983 coho run may also be above average.

Figure 1. Norton Sound Commercial Salmon Fishing Subdistricts

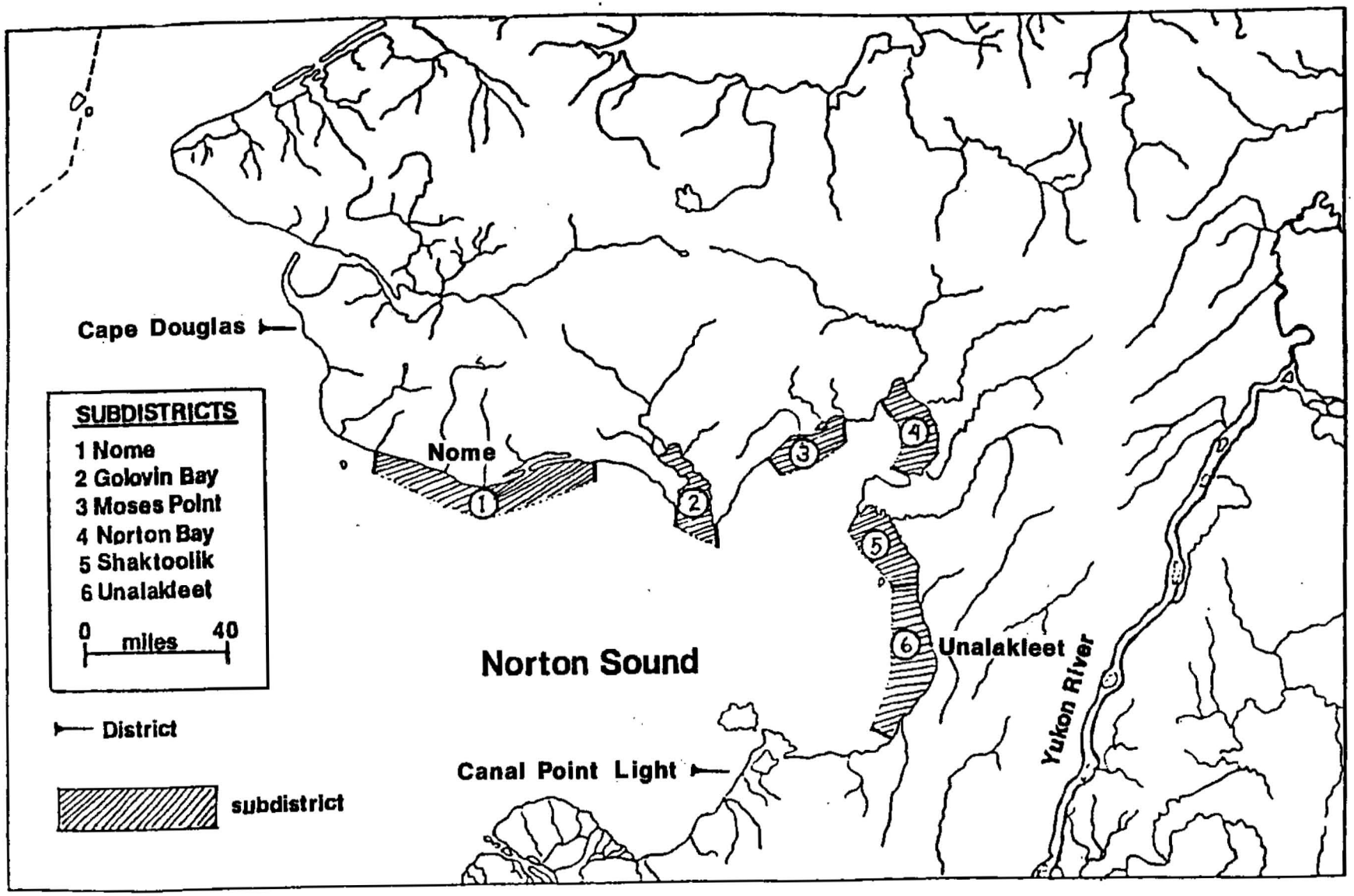


Table 1. 1982 Norton Sound Commercial Salmon Catch by Subdistrict.

Subdistrict	Chinook	Sockeye	Coho	Pink	Chum	Total
Nome	20	-	1183	18512	13447	33162
Golovin	78	5	4281	39510	51970	95844
Moses Point	253	-	318	9849	40030	50450
Norton Bay	96	-	2332	2535	7128	12091
Shaktoolik	1677	3	22233	17019	26240	67172
Unalakleet	3768	2	61343	142856	44520	252489
District Total	5892	10	91690	230281	183335	511208

Table 2 . Norton Sound Subsistence Salmon Catches, 1982.

Subdistrict	Village	Number Fishermen Interviewed	Chinook	Sockeye	Coho	Pink	Chum	TOTAL
1	Nome	132	21	6	1829	19202	4831	25889
2	White Mountain	12	2	-	852	1865	771	3490
2	Council	5	-	-	170	550	560	1280
2	Golovin	17	5	-	299	2337	538	3179
3	Elim	25	1	-	1835	3785	3537	9158
4	Koyuk	16	1	-	484	2600	2485	5570
5	Shaktoolik	22	68	-	2138	3865	1165	7236
6	Unalakleet	63	913	2	7037	20045	4694	32691
	Stebbins	18	175	-	2230	1006	2514	5925
	St. Michaels	9	142	-	1000	1040	2090	4272
	TOTALS	320	1,328	8	17,874	56,295	23,185	98,690

Table 3 . Nome (Subdistrict 1) Subsistence Salmon Catch, 1982.

	Permits Issued	Permits Returned	Permits Actually Fished	Chinook	Sockeye	Coho	Pinks	Chum	Total
Nome	87	70	51	4	-	844	6261	332	7441
Marine	61	54	37	6	5	382	8775	2813	11981
Sinuk	4	2	2	-	-	-	21	29	50
Eldorado	20	19	15	7	-	132	1599	980	2718
Flambeau	11	8	7	2	-	22	771	233	1028
Snake	12	12	11	1	1	384	947	217	1550
Penny	2	2	1	-	-	47	2	1	50
Solomon	6	4	2	-	-	-	240	18	258
Feather	-	-	-	-	-	-	-	-	-
Bonanza	5	4	3	1	-	-	546	208	755
Cripple	5	3	3	-	-	18	40	-	58
TOTALS	213	178	132	21	6	1829	19202	4831	25889

Table 4. Peak aerial survey counts of Norton Sound streams, 1982.

Stream name	Chums	Pinks	Kings	Coho
Nome River	219	279,700		
Flambeau	5,083	25,001		
Eldorado	1,095	163,300		
Bonanza	380	67,800		
Solomon	487	54,100		
Sinuk	638	148,800		
Fish 1/		241,700		
Niukluk	2,332	227,315		
Boston	1,730	22,020	10	
Tubutulik	2,044	53,530	44	
Kwiniuk 2/	41,000	435,000	138	
Ungalik	290	37,650		
Shaktoolik 3/	48	36,550		
Unalakleet 3/	563	6,227		
North Fork 3/				3,648
North River 3/	599	173,352	7	
Old Woman 3/	78	7,712		628
Unalakleet System 4/	195,000	5,744,000	7,500	65,000

1/ No estimate on chums due to numerous pink salmon
2/ Kwiniuk reflects tower counts.
3/ Surveyed after peak under poor conditions.
4/ Preliminary sonar counts, (note: chum count is probably high due to the overlap in timing of the pink and chum runs)

Table 5. Commercial salmon catches from Nome, subdistrict 1, Norton Sound*, set gill nets, 1982.

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
6/17	6	0								
6/18	18	10	2			645	2			645
	24	10	2(.01)			645(2.7)				
6/21	6	1	3				5			
6/22	24	11	1		29	1553	6		29	2198
6/23	18	14	3		108	2391	9		137	4589
	48	15	7(.01)		137(.19)	3944(5.5)				
6/24	6	2				237				4826
6/25	24	14	5		381	3306	14		518	8132
6/26 1/	18	12	2		315	2838	16		833	10970
	48	14	7(.01)		696(1.0)	6381(9.5)				
7/5 2/	6	0								
7/6	24	0								
7/7	24	8	1		2122	232	17		2955	11202
7/8	24	12			9237	938			12192	12140
7/9	24	7			2034	297			14226	12437
7/10	18	5			3700	275			17926	12712
	120	14	1		17093(10.2)	1742(1.0)				
7/12	6	0								
7/13	24	0								
7/14	18	1			12	1	17		17938	12713
	48	1			12(.25)	1(.02)				

* preliminary data

1/ Commercial fishery closed by emergency order after this period; re-opened 7/5 with a mesh size restriction of 4 1/2" or less to harvest pink salmon

2/ Period extended due to stormy weather.

Table 5. Commercial salmon catches from Nome, subdistrict 1, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
7/15	6	0								
7/16	24	1			250	92			18188	12805
7/17	18	1			180	140	17		18368	12945
	48	1			430(9.0)	232(4.8)				
7/19	6	0								
7/20	24	0								
7/21	18	1				156	17		18368	13101
	48	1				156(3.3)				
7/22	6	0								
7/23	24	0								
7/24	18	1				18	17		18368	13119
	48	1				18(.38)				
7/26	6	0								
7/27	24	1				10				13129
7/28	18	1				16	17		18368	13145
	48	1				26(.54)				
7/29	6	0								
7/30	24	2	1	2		23	18	2		13168
7/31	18	2		1		9		3	18368	13177
	48	2	1	3(.03)		32 (.33)				

* preliminary data

Table 5. Commercial salmon catches from Nome, subdistrict 1, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
8/2 3/	6	1			144				18512	
8/3	18	4		202		203	18	205		13380
	24	4		202(2.1)	144(1.5)	203(2.1)				
8/5	6	0								
8/6	18	4		194		10	18	399	18512	13390
	24	4		194(2.0)		10(.1)				
8/9	6	0								
8/10	18	5	2	278		39	20	677	18512	13429
	24	5	2(.02)	278(2.3)		39(.33)				
8/12	6	0								
8/13	18	0	STORMY - NO ONE FISHED				20	677	18512	13429
	24	0								
8/16	6	0								
8/17	18	0	STORMY - NO ONE FISHED				20	677	18512	13429
	24	0								
8/19 2/	6	0								
8/20	24	3		72		7		749		13436
8/21	18	2		127		10	20	876	18512	13446
	48	3		199(1.4)		17(.12)				

* preliminary data

2/ Period extended due to stormy weather.
3/ Gear restrictions lifted for August coho salmon run.

Table 5. Commercial salmon catches from Nome, subdistrict 1, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
8/23	6	0								
8/24	18	3		185		1	20	1061	18512	13447
	24	3		185 (2.6)		1(+)				
8/26	6	0								
8/27	18	2		59			20	1120	18512	13447
	24	2		59(1.2)						
8/30	6	0								
8/31	18	2		63			20	1183	18512	13447
	24	2		63(1.3)						
TOTALS	768	18					20	1183	18512	13447

Season closed 8/31 by regulation.

* preliminary data

Table 6. Commercial salmon catches from Golovin, subdistrict 2, Norton Sound*, set gill nets, 1982.

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
6/17	6	3			6	125			6	125
6/18	18	10	14		100	1926	14		106	2051
	24	10	14(.06)		106(.44)	2051(8.6)				
6/21 1/	6									
6/22	24									
6/23	18									
	48	15	24(.03)		695(.97)	7370(10.2)	38		801	9421
6/24	6	9	1		234	919	39		1035	10340
6/25	24	14	4		1246	3989	43		2281	14329
6/26	18	13	5		979	3555	48		3260	17884
	48	14	10(.01)		2459(3.7)	8463(12.6)				
6/28	6	6	2		220	516	50		3480	18400
6/29	24	15	6		1416	3173	56		4896	21573
6/30	18	16	3		1419	3127	59		6315	24700
	48	16	11(.01)		3055(4.0)	6816(8.9)				
7/1	6	12			1362	1820			7677	26520
7/2	24	15	2		3576	2778	61		11253	29298
7/3	18	15	4		3346	3648	65		14599	32946
	48	15	6(.01)		8284(11.5)	8246(11.5)				

* preliminary data

1/ Daily catch information not available for this period.

Table 6. Commercial salmon catches from Golovin, subdistrict 2, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/26	6	0								
7/27	24	4	1	2	726	205	73	12	37509	50974
7/28	18	4	1	8	444	45	74	20	37953	51019
	48	4	2(.01)	10(.05)	1170(6.1)	250(1.3)				
7/28 2/	3	0								
7/29	9	0	NO ONE FISHED				74	20	37953	51019
	12	0								
7/29	6	2		5	312	14		25	38265	51033
7/30	24	5		33	317	101		58	38582	51134
7/31	18	6		102	433	240	74	160	39015	51374
	48	7		140(.42)	1062(3.2)	355(1.1)				
8/2	6	4		10	81	12		170	39096	51386
8/3	24	5		128	117	55		298	39213	51441
8/4	18	4		118	100	55	74	416	39313	51496
	48	7		256(.76)	298(.89)	122(.36)				
8/5	6	4		53	13	24		469	39326	51520
8/6	24	9	1	710	67	83	75	1179	39393	51603
8/7	18	9		396	40	64		1575	39433	51667
	48	9	1(+)	1159(2.7)	120(.28)	171(.40)				

* preliminary data

2/ "pink gear only" period.

Table 6. Commercial salmon catches from Golovin, subdistrict 2, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
8/9	6	2		66	1	14		1641	39434	51681
8/10	24	6		448	34	69		2089	39468	51750
8/11	18	6	1	474	15	26	76	2563	39483	51776
	48	6	1(+)	988(3.4)	50(.17)	109(.38)				
8/12	6	1		54	7	4		2617	39490	51780
8/13	24	3		111	5	8		2728	39495	51788
8/14	18	4		113	7	9	76	2841	39502	51797
	48	5		278(1.2)	19(.08)	21(.09)				
8/16	6	0								
8/17	24	5		81		33		2922		51830
8/18	18	2		13		4	76	2935	39502	51834
	48	5		94(.39)		37(.15)				
8/19	6	0								
8/20	24	3		218	1	45		3153	39503	51879
8/21	18	3		80		11	76	3233		51890
	48	3		298(2.1)	1(+)	56(.39)				
8/23	6	3		50		5		3283		51895
8/24	24	4		212	4	23		3495	39507	51918
8/25	18	4		138		11	76	3633		51929
	48	4		400(2.1)	4(+)	39(.20)				

* preliminary data

Table 6. Commercial salmon catches from Golovin, subdistrict 2, Norton Sound,* set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)[3/] Chinook	Coho	Pink	Chum	Cumulative catch[3/] Chinook	Coho	Pink	Chum
8/26	6	2		38		2		3671		51931
8/27	24	5	1	171	1	9	77	3842	39508	51940
8/28	18	5	1	123	2	6	78	3965	39510	51946
	48	5	2(+)	332(1.4)	3(+)	17(.07)				
8/30	6	3		84		7		4049		51953
8/31	24	3		142		14		4191		51967
9/1	18	3		90		3	78	4281	39510	51970
	48	3		316(2.2)		24(.17)				
TOTALS	1152	17					78	4281.	39510	51970

Season closed 9/1 by emergency order.

* preliminary data

3/ Data does not include a harvest of 5 sockeye salmon.

Table 7. Commercial salmon catches from Moses Point, subdistrict 3, Norton Sound*, set gill nets, 1982.

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
6/17	6	1			1	45			1	45
6/18	18	13	4		12	1192	4		13	1237
	24	14	4(.01)		13(0.4)	1237(3.7)				
6/21	6	0								
6/22	18	18	34		217	4008	38		230	5245
	24	18	34(.08)		217(0.5)	4008(9.3)				
6/24	6	13	14		148	1210	52		378	6455
6/25	18	17	19		276	2463	71		654	8918
	24	20	33(.07)		424(.88)	3673(7.7)				
6/28	6	1	1		36	64	72		690	8982
6/29	24	21	23		1029	3260	95		1719	12242
6/30	18	22	27		1434	4257	122		3153	16499
	48	22	51(.05)		2499(2.4)	7581(7.2)				
7/1	6	0								
7/2	24	23	76		3677	7265	198		6830	23764
7/3	24	25	15		1316	4318	213		8146	28082
7/4	18	21	11			2109	224			30191
	72	26	102(.05)		4993(2.7)	13692(7.3)				

* preliminary data

Table 7. Commercial salmon catches from Moses Point, subdistrict 3, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/5	6	0								
7/6	24	9	3			745	227			30936
7/7	24	14	4			1153	231			32089
7/8	24	14	3			992	234			33081
7/9	24	10	1			558	235			33639
7/10	24	16	6			1312	241			34951
7/11	18	12	4			824	245		8146	35775
	144	21	21(.01)			5584(1.9)				
7/12	6	0								
7/13	24	8				657				36432
7/14	24	15	1			1075	246			37507
7/15	24	13	2		16	603	248		8162	38110
7/16	24	9			213	450			8375	38560
7/17	24	8			326	401			8701	38961
7/18	18	6			178	218			8879	39179
	144	16	3(+)		733(.32)	3404(1.5)				
7/19	6	0								
7/20	24	3		1	140	75		1	9019	39254
7/21	24	6	1	1	200	202	249	2	9219	39456
7/22	24	0								
7/23	24	0								
7/24	24	2		4	64	59		6	9283	39515
7/25	18	6	1	2	356	228	250	8	9639	39743
	144	10	2(+)	8(.01)	760(.53)	564(.39)				

* preliminary data

Table 7. Commercial salmon catches from Moses Point, subdistrict 3, Norton Sound*, set gill nets, 1982(continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
7/26	6	0								
7/27	24	2		3	44	42		11	9683	39785
7/28	24	0								
7/29	24	3		2	15	21		13	9698	39806
7/30	24	4	1	7	71	41	251	20	9769	39847
7/31	24	3		1	57	68		21	9826	39915
8/1	18	2	1	8	23	21	252	29	9849	39936
	144	6	2(+)	21(.02)	210(.24)	193(.22)				
8/2	6	0								
8/3	24	4		30		24		59		39960
8/4	18	1		25		1		84	9849	39961
	48	4		55(.29)		25(.13)				
8/5	6	1		3		3		87		39964
8/6	24	2	1	27		19	253	114		39983
8/7	18	3		98		26		212	9849	40009
	48	3	1(+)	128(.89)		48(.33)				
8/9	6	0								
8/10	24	1		52		9		264		40018
8/11	18	2		54		12	253	318	9849	40030
	48	2		106(1.1)		21(.22)				
TOTALS	912	28					253	318	9849	40030

COOP CLOSED 8/12.

* preliminary data

Table 8.Commercial salmon catches from Norton Bay, subdistrict 4, Norton Sound*, set gill nets, 1982.

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
6/17	6	0								
6/18	18	0	NO BUYER							
	24	0								
6/21	6	0								
6/22	24	3	5		56	116	5		56	116
6/23	18	7	9		31	165	14		87	281
	48	7	14(.04)		87(.26)	281(.84)				
6/24	6	0								
6/25	24	8	11		136	336	25		223	617
6/26	18	6	11		126	209	36		349	826
	48	9	22(.05)		262(.61)	545(1.3)				
6/28	6	0								
6/29	24	0								
6/30	18	9	30		924	699	66		1273	1525
	48	9	30(.07)		924(2.1)	699(1.6)				
7/1	6	0								
7/2	24	0								
7/3	18	8	20		673	976	86		1946	2501
	48	8	20(.05)		673(1.8)	976(2.5)				

* preliminary data

Table 8.Commercial salmon catches from Norton Bay, subdistrict 4, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/5	6	0								
7/6	24	0								
7/7	18	8	5			943	91		1946	3444
	48	8	5(.01)			943(2.5)				
7/7 1/	3	0								
7/8	9	0	NO ONE FISHED				91		1946	3444
	12	0								
7/8	6	0								
7/9	24	0								
7/10	18	7	1			686	92		1946	4130
	48	7	1(+)			686(2.0)				
7/11 1/	12	0								
7/12	12	0	NO ONE FISHED				92		1946	4130
	24	0								
7/12	6	0								
7/13	24	0			24	377				
7/14	18	7					92		1970	4507
	48	7			24(.07)	377(1.1)				
7/14 1/	3	0								
7/15	9	0	NO ONE FISHED				92		1970	4507
	12	0								

* preliminary data

1/ "pink gear only" period.

Table 8. Commercial salmon catches from Norton Bay, subdistrict 4, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/15	6	0								
7/16	24	9	1		28	317	93		1998	4824
7/17	18	9			531	243			2529	5067
	48	9	1(+)		559(1.3)	560(1.3)				
7/18 1/	12	0								
7/19	12	0	NO ONE FISHED				93		2529	5067
	24	0								
7/19	6	4		6	6	302		6	2535	5369
7/20	24	8	2	7		323	95	13		5692
7/21	18	0								
	48	9	2(+)	13(.03)	6(.01)	625(1.5)				
7/21 1/	3	0								
7/22	9	0	NO ONE FISHED				95	13	2535	5692
	12	0								
7/22	6	0								
7/23	24	0								
7/24	18	1				126	95	13	2535	5818
	48	1				126(2.6)				
7/25 1/	12	0								
7/26	12	0	NO ONE FISHED				95	13	2535	5818
	24	0								

* preliminary data

1/ "pink gear only" period.

Table 8. Commercial salmon catches from Norton Bay, subdistrict 4, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/26	6	0					95	13	2535	5818
7/27	24	0	NO BUYER							
7/28	18	0								
	48	0								
7/28 1/	3	0	NO ONE FISHED				95	13	2535	5818
7/29	9	0								
	12	0								
7/29	6	0								
7/30	24	0								
7/31	18	3		212		405	95	225	2535	6223
	48	3		212(1.5)		405(2.8)				
8/2	6	0								
8/3	24	0								
8/4	18	8	1	1253		497	96	1478	2535	6720
	48	8	1(+)	1253(3.3)		497(1.3)				
8/5	6	0								
8/6	24	0	NO BUYER							
8/7	18	0					96	1478	2535	6720
	48	0								
8/9	6	0								
8/10	24	0								
8/11	18	8		541		316	96	2019	2535	7036
	48	8		541(1.4)		316(.82)				

* preliminary data
1/ "Pink gear only" period.

Table 8. Commercial salmon catches from Norton Bay, subdistrict 4, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
8/12	6	0								
8/13	24	0	NO BUYER				96	2019	2535	7036
8/14	18	0								
	48	0								
8/16	6	0								
8/17	24	0								
8/18	18	0	NO BUYER				96	2019	2535	7036
	48	0								
8/19	6	0								
8/20	24	0					96	2019	2535	7036
8/21	24	0	NO BUYER							
8/22	18	0								
	72	0								
8/23	6	0								
8/24	24	0								
8/25	18	4		52		32	96	2071	2535	7068
	48	4		52(.27)		32(.17)				
8/26	6	0								
8/27	24	0								
8/28	24	5		261		60				
8/29	18	0					96	2332	2535	7128
	72	5		261(.73)		60(.17)				

* preliminary data

Table 8 .Commercial salmon catches from Norton Bay, subdistrict 4, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
8/30	6	0								
8/31	24	0	NO BUYER				96	2332	2535	7128
9/1	18	0								
	48	0								
9/2	6	0								
9/3	24	0	NO BUYER							
9/4	18	0					96	2332	2535	7128
	48	0								
TOTALS	1248	10					96	2332	2535	7128

Season closed 9/4 by emergency order.

* preliminary data.

Table 9. Commercial salmon catches from Shaktoolik, subdistrict 5, Norton Sound*, set gill nets, 1982.

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
6/17	6	6	27			36	27			36
6/18	18	10	43		1	71	70		1	107
	24	10	70(.29)		1	107(.45)				
6/21	6	7	22		38	143	92		39	250
6/22	24	14	307		185	1189	399		224	1439
6/23	18	15	201		95	856	600		319	2295
	48	16	530(.69)		318(.41)	2188(2.9)				
6/24	6	8	13		141	285	613		460	2580
6/25	24	17	319		405	1677	932		865	4257
6/26	18	16	193		445	2000	1125		1310	6257
	48	17	525(.69)		991(1.2)	3962(2.9)				
6/28	6	3	12		12	23	1137		1322	6280
6/29	24	17	183		2478	2648	1320		3800	8928
6/30	18	18	139		1119	2290	1459		4919	11218
	48	18	334(.39)		3609(4.2)	4961(5.7)				
7/1	6	11	34		1552	1281	1493		6471	12499
7/2	24	9	35		1793	1058	1528		8264	13557
7/3	18	15	47		1734	1578	1575		9998	15135
	48	16	116(.15)		5079(6.6)	3917(5.1)				

* preliminary data

Table 9. Commercial salmon catches from Shaktoolik, subdistrict 5, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/5	6	6	9		583	112	1584		10581	15247
7/6	24	11	36		1880	1113	1620		12461	16360
7/7	18	10	13		964	403	1633		13425	16763
	48	12	58(.10)		3427(6.0)	1628(2.8)				
7/7 1/	3	0								
7/8	9	0	NO ONE FISHED							
	12	0								
7/8	6	5				196				16959
7/9	24	5	4			365	1637			17324
7/10	18	5	5			330	1642		13425	17654
	48	11	9(.02)			891(1.7)				
7/11 1/	12	0								
7/12	12	0	NO ONE FISHED							
	24	0								
7/12	6	9	2		361	403	1644		13786	18057
7/13	24	13	8		865	885	1652		14651	18942
7/14	18	9	2	3	70	710	1654	3	14721	19652
	48	13	12(.02)	3(+)	1296(2.1)	1998(3.2				
7/14 1/	3	0					1654	3	14721	19652
7/15	9	0	NO ONE FISHED							
	12	0								

* preliminary data

1/ "pink gear only" period.

Table 9. Commercial salmon catches from Shaktoolik, subdistrict 5, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/15	6	13	3		490	662	1657		15211	20314
7/16	24	11	6	6	611	567	1663	9	15822	20881
7/17	18	9	2	3	194	581	1665	12	16016	21462
	48	14	11(.02)	9(.01)	1295(1.9)	1810(2.7)				
7/18 1/	12	0								
7/19	12	0	NO ONE FISHED				1665	12	16016	21462
	24	0								
7/19	6	7		7	158	153		19	16174	21615
7/20	24	13	3	22	677	1116	1668	41	16851	22731
7/21	18	6	1	7	167	178	1669	48	17018	22909
	48	15	4(.01)	36(.05)	1002(1.4)	1447(2.0)				
7/21 1/	3	0								
7/22	9	0	NO ONE FISHED				1669	48	17018	22909
	12	0								
7/22	6	0								
7/23	24	0								
7/24	18	2	2	30		163	1671	78	17018	23072
	48	2	2(.02)	30(.31)		163(1.7)				
7/25 1/	12	0								
7/26	12	0	NO ONE FISHED				1671	78	17018	23072
	24	0								

* preliminary data

1/ "pink gear only" period.

Table 9. Commercial salmon catches from Shaktoolik, subdistrict 5, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/26	6	0								
7/27	24	6		43		47		121		23119
7/28	18	4		52		57	1671	173	17018	23176
	48	7		95(.28)		104(.31)				
7/28 1/	3	0								
7/29	9	0	NO ONE FISHED							
	12	0								
7/29	6	7		198		136		371		23312
7/30	24	2		78		51		449		23363
7/31	18	3		25		27	1671	474	17018	23390
	48	9		301(.70)		214(.50)				
8/2	6									
8/3	24	2		542	1	24		1016		23414
8/4	18	14		2579		415	1671	3595	17019	23829
	48	15		3121(4.3)	1(+)	439(.61)				
8/5	6	7		420		126		4015		23955
8/6	24	14	2	1591		453		5606		24408
8/7	18	13		945		232	1673	6551	17019	24640
	48	14	2(+)	2956(4.4)		811(1.2)				

* preliminary report

1/ "pink gear only" period.

Table 9. Commercial salmon catches from Shaktoolik, subdistrict 5, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
8/9	6	1		285		35		6836		24675
8/10	24	19	1	2993		696		9829		25371
8/11	18	15	1	1675		432	1675	11504	17019	25803
	48	20	2(+)	4953(5.2)		1163(1.2)				
8/12	6	1		97		9		11601		25812
8/13	24	1		45		7		11646		25819
8/14	18	1		86		9	1675	11732	17019	25828
	48	2		228(2.4)		25(.25)				
8/16	6	1		16				11748		
8/17	24	17		2780		121		14528		25949
8/18	18	10		544		21	1675	15072	17019	25970
	48	19		3340(3.7)		142(.16)				
8/19	6	13		834		17		15906		25987
8/20	24	18	1	1509		113		17415		26100
8/21	24	18	1	2157		74	1677	19572		26174
8/22	18	12		670		7		20242	17019	26181
	72	20	2(+)	5170(3.6)		211(.15)				
8/23	6	1		12		1		20254		26182
8/24	24	11		771		35		21025		26217
8/25	18	11		246		20	1677	21271	17019	26237
	48	15		1029(1.4)		56(.08)				

* preliminary data

Table 9. Commercial salmon catches from Shaktoolik, subdistrict 5, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) 2/				Cumulative catch 2/			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
8/26	6	0								
8/27	24	5		663		3		21934		
8/28	24	0								
8/29	18	3		299		_	1677	22233	17019	26240
	72	5		962(2.7)		3(.01)				
8/30	6	0								
8/31	24	0	NO BUYER							
9/1	18	0					1677	22233	17019	26240
	48	0								
9/2	6	0								
9/3	24	0	NO BUYER							
9/4	18	0					1677	22233	17019	26240
	48	0								
TOTALS	1248	32					1677	22233	17019	26240

Season closed 9/4 by emergency order.

* preliminary data

2/ Data does not inlcude a harvest of 3 sockeye salmon.

Table 10. Commercial salmon catches from Unalakleet, subdistrict 6, Norton Sound*, set gill nets, 1982.

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
6/17	6	18	100		4	7	100		4	7
6/18	18	41	373		29	58	473		33	65
	24	42	473(.47)		33(.03)	65(.06)				
6/21	6	13	74		33	35	547		66	100
6/22	24	48	595		308	526	1142		374	626
6/23	18	48	344		257	460	1486		631	1086
	48	54	1013(.39)		598(.23)	1021(.39)				
6/24	6	17	119		162	156	1605		793	1242
6/25	24	44	247		639	501	1852		1432	1743
6/26	18	43	197		876	507	2049		2308	2250
	48	54	563(.21)		1677(.64)	1164(.44)				
6/28	6	25	144		326	261	2193		2634	2511
6/29	24	49	375		2790	1363	2568		5424	3874
6/30	18	57	275		4063	2581	2843		9487	6455
	48	58	794(.29)		7179(2.6)	4205(1.5)				
7/1	6	32	69		1244	789	2912		10731	7244
7/2	24	52	340		12369	3559	3252		23100	10803
7/3	18	50	144		8289	2029	3396		31389	12832
	48	53	553(.22)		21902(8.6)	6377(2.5)				

* preliminary data

Table 10. Commercial salmon catches from Unalakleet, subdistrict 6, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
7/5	6	9	2		594	18	3398		31983	12850
7/6	24	49	116		15283	3683	3514		47266	16533
7/7	18	51	68		12802	2429	3582		60068	18962
	48	54	186(.07)		28679(11.1)	6130(2.4)				
7/7 1/	3	4	1		3473	62	3583		63541	19024
7/8	9	17	2		19260	92	3585		82801	19116
	12	18	3(.01)		22733(105.3)	154(.71)				
7/8	6	24	12		1111	1081	3597		83912	20197
7/9	24	11	7		189	525	3604		84101	20722
7/10	18	36	39	2	2062	2677	3643	2	86163	23399
	48	43	58(.03)	2(+)	3362(1.6)	4283(2.1)				
7/11 1/	12	7	4		4920	131	3647		91083	23530
7/12	12	11	8	1	8371	212	3655	3	99454	23742
	24	12	12(.04)	1(+)	13291(46.2)	343(1.2)				
7/12	6	19	3		1329	397	3658		100783	24139
7/13	24	51	21	1	8768	2488	3679	4	109551	26627
7/14	18	49	12	2	7904	1574	3691	6	117455	28201
	48	54	36(.01)	3(+)	18001(6.9)	4459(1.7)				
7/14 1/	3	2			374	13			117829	28214
7/15	9	10			2846	136	3691	6	120675	28350
	12	10			3220(26.8)	149(1.2)				

* preliminary data

1/ "pink gear only" period.

Table 10. Commercial salmon catches from Unalakleet, subdistrict 6, Norton Sound*, set gill nets, 1982(continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
7/15	6	23	1	1	952	412	3692	7	121627	28762
7/16	24	41	4	1	5342	853	3696	8	126969	29615
7/17	18	40	5	2	2983	2270	3701	10	129952	31885
	48	47	10(+)	4(+)	9277(4.1)	3535(1.6)				
7/18 1/	12	7			1420	228			131372	32113
7/19	12	9	5	5	3283	729	3706	15	134655	32842
	24	10	5(.02)	5(.02)	4703(19.6)	957(4.0)				
7/19	6	32	4	17	983	733	3710	32	135638	33575
7/20	24	45	5	62	2258	1721	3715	94	137896	35296
7/21	18	20	1	7	280	615	3716	101	138176	35911
	48	50	10(+)	86(.04)	3521(1.5)	3069(1.3)				
7/21 1/	3	3			151	20			138327	35931
7/22	9	1			28	3	3716	101	138355	35934
	12	3			179(5.0)	23(.64)				
7/22	6	13	1	16	260	342	3717	117	138615	36276
7/23	24	9	1	30	162	162	3718	147	138777	36438
7/24	18	21	5	281	742	1528	3723	428	139519	37966
	48	30	7(+)	327(.23)	1164(.81)	2032(1.4)				
7/25 1/	12	7	1	120	517	85	3724	548	140036	38051
7/26	12	8		208	638	137		756	140674	38188
	24	10	1(+)	328(1.6)	1155(5.7)	222(.77)				

* preliminary data

1/ "pink gear only" period.

Table 10. Commercial salmon catches from Unalakleet, subdistrict 6, Norton Sound*, set gill nets,1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour)				Cumulative catch			
			Chinook	Coho	Pink	Chum	Chinook	Coho	Pink	Chum
7/26	6	11		136	45	88		892	140719	38276
7/27	24	36	2	922	589	1097	3726	1814	141308	39373
7/28	18	39	5	520	553	694	3731	2334	141861	40067
	48	44	7(+)	1578(.75)	1187(.56)	1879(.89)				
7/28 1/	3	1		17	26	3		2351	141887	40070
7/29	9	3		25	118	20	3731	2376	142005	40090
	12	3		42(1.2)	144(4.0)	23(.64)				
7/29	6	12		108	78	101		2484	142083	40191
7/30	24	12		265	89	119		2749	142172	40310
7/31	18	26		845	91	311	3731	3594	142263	40621
	48	33		1218 (.76)	258(.16)	531(.33)				
8/2	6	22		951	140	105		4545	142403	40726
8/3	24	37	2	2198	264	152	3733	6743	142667	40878
8/4	18	42	1	3105	127	162	3734	9848	142794	41040
	48	47	3(+)	6254(2.8)	531(.24)	419(.19)				
8/5	6	32	1	1797	7	109	3735	11645	142801	41149
8/6	24	41	1	4091	15	236	3736	15736	142816	41385
8/7	18	46		2183	8	170		17919	142824	41555
	48	48	2(+)	8071(3.5)	30(.01)	515(.22)				

* preliminary data

1/ "pink gear only" period.

Table 10.Commercial salmon catches from Unalakleet, subdistrict 6, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Coho	Pink	Chum	Cumulative catch Chinook	Coho	Pink	Chum
8/9	6	21	1	1524	5	200	3737	19443	142829	41755
8/10	24	41	4	2659	10	450	3741	22102	142839	42205
8/11	18	45	4	4769	10	669	3745	26871	142849	42874
	48	45	9(+)	8952(4.1)	25(.01)	1319(.61)				
8/12	6	26	2	1516	2	149	3747	28387	142851	42023
8/13	24	19		1238		122		29625		43145
8/14	18	37		4365	2	432		33990	142853	43577
	48	45	2(+)	7119(3.3)	4(+)	703(.33)				
8/16	6	16		938	1	42		34928	142854	43619
8/17	24	36	1	5046		247	3748	39974		43866
8/18	18	41	2	2449		68	3750	42423		43934
	48	43	3(+)	8433(4.1)	1(+)	357(.17)				
8/19	6	37		2933		44		45356		43978
8/20	24	40	2	1628		75	3752	46984		44053
8/21	24	37	5	1843		75	3757	48827		44128
8/22	18	33	2	1430		55	3759	50257	142854	44183
	72	45	9(+)	7834(2.4)		249(.08)				
8/23	6	7		266		3		50523		44186
8/24	24	33	1	1063	1	54	3760	51586	142855	44240
8/25	18	36	1	865		38	3761	52451		44278
	48	39	2(+)	2194(1.2)	1(+)	95(.05)				

* preliminary data

Table 10. Commercial salmon catches from Unalakleet, subdistrict 6, Norton Sound*, set gill nets, 1982 (continued).

Date of Landing	Hours Fished	Number Boats	Total (catch/boat hour)[2/] Chinook	Coho	Pink	Chum	Cumulative catch[2/] Chinook	Coho	Pink	Chum
8/26	6	20		453		24		52904		44302
8/27	24	35	3	2455	1	120	3764	55359	142856	44422
8/28	24	16	4	1494		98	3768	56853		44520
8/29	18	0								
	72	38	7(+)	4402(1.6)	1(+)	242(.09)				
8/30	6	0								
8/31	24	7		951				57804		
9/1	18	12		1173			3768	58977	142856	44520
	48	12		2124 (3.7)						
9/2	6	3		83				59060		
9/3	24	10		1101				60161		
9/4	18	13		1182			3768	61343	142856	44520
	48	13		2368(3.8)						
TOTALS	1248	68					3768	61343	142856	44520

Season closed 9/4 by emergency order.

* preliminary data

2/ Data does not include a harvest of 2 sockeye salmon.

Appendix Table 1. Number of Fishermen fishing in Norton Sound, 1970-1982.

YEAR	SUBDISTRICT 1	2	3	4	5	6	DISTRICT[1/] Totals
1970	6	33	21	0	12	45	2/
1971	7	22	45	6	19	72	2/
1972	20	20	48	32	20	71	2/
1973	21	34	57	30	27	94	2/
1974	25	25	60	8	23	53	2/
1975	24	42	67	42	39	61	2/
1976	21	22	54	27	37	60	2/
1977	14	25	52	24	30	45	164
1978	16	24	44	26	26	51	176
1979	15	21	41	22	29	63	175
1980	14	17	26	13	26	66	159
1981	15	19	33	10	26	73	167
1982	18	17	28	10	32	68	164

1/ District total is the number of fishermen that actually fished in Norton Sound. Subdistrict totals may exceed the District total because a fishermen may have fished in more than one subdistrict.

2/ Data not available.

Appendix Table 2. Commercial and subsistence salmon catches by species by subdistrict, Norton Sound district, 1961-1982.

Year	Commercial						Subsistence					Combined					
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
							NOME (SUBDISTRICT 1)										
1964	5	-	-	1	1194	1200	-	-	-	-	-	5	-	-	1	1194	1200
1965	1	-	-	193	1941	2135	-	-	780	1825	2605	1	-	-	973	3766	4740
1966	1	-	32	1	581	615	12	192	1794	1762	3760	13	-	224	1795	2343	4375
1967	-	-	-	72	406	478	11	36	349	627	1023	11	-	36	421	1033	1501
1968	-	-	-	50	102	152	7	108	6507	621	7243	7	-	108	6557	723	7395
1969	-	-	63	330	601	994	2	27	3649	508	4186	2	-	90	3979	1109	5180
1970	-	-	6	55	960	1019	-	35	5001	458	5494	-	-	41	5056	1418	6513
1971	11	-	-	14	2315	2340	-	122	5457	2900	8479	11	-	122	5471	5215	10819
1972	15	-	-	12	2643	2670	19	52	4684	315	5070	34	-	52	4696	2958	7740
1973	-	-	-	321	1132	1453	14	120	5108	1863	7114	14	-	129	5429	2995	8567
1974	19	-	123	7722	10431	18295	8	5	3818	183	4014	27	-	128	11540	10614	22309
1975	2	-	319	2163	8364	10848	2	97	6267	2858	9224	4	-	416	8430	11222	20072
1976	2	10	26	1331	7620	8989	13	189	5492	1705	7399	15	10	215	6823	9325	16388
1977	8	-	58	65	15998	16129	35	498	2773	12192	15498	43	-	556	2838	28190	31627
1978	19	-	-	22869	8782	31670	35	225	13063	4295	17618	54	-	225	35932	13077	49288
1979	9		29	5860	5391	11289	11	1120	6353	3273	10757	20	-	1149	12213	8664	22046
1980	8	-	-	10007	13922	23937	129	2157	22246	5983	30515	137	-	2157	32253	19905	54452
1981	4	-	508	3202	18666	22380	35	1726	5584	8579	15938 3/	39	14	2234	8786	27245	38318
1982	20	-	1183	18512	13447	33162	21	1829	19202	4831	25889 4/	41	6	3012	37714	18278	59051
5-year avg. 1/	10	-	119	8401	12552	21081	49	1145	10004	6864	18065	59	3	1264	18404	19416	39146
10-year avg. 2/	9	1	106	5355	9295	14766	30	619	7539	4125	12315	39	2	726	12894	13420	27081

1/ 1977-1981
2/ 1972-1981
3/ Total includes 14 sockeye
4/ Total includes 6 sockeye

Appendix Table 3. Commercial and subsistence salmon catches by species by subdistrict, Norton Sound district, 1961-1982.

Year	Commercial						Subsistence					Combined					
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
							GOLOVIN BAY (SUBDISTRICT 2)										
1962	45	11	264	10276	68720	79316	-	-	-	-	-	45	11	264	10276	68720	79316
1963	40	40	-	19677	49850	69607	-	118	5702	9319	15139	40	40	118	25379	59169	84746
1964	27	40	3	7236	58301	65607	-	-	-	-	-	27	40	3	7236	58301	65607
1965	-	-	-	-	-	-	2	49	1523	3847	5421	2	-	49	1523	3847	5421
1966	17	14	584	4665	29791	35071	4	176	1573	3520	5273	21	14	760	6238	33311	40344
1967	10	-	747	5790	31193	37740	3	185	2774	4803	7765	13	-	932	8564	35996	45505
1968	12	-	205	18428	10011	28656	4	181	4955	1744	6884	16	-	386	23383	11755	35540
1969	28	-	1224	23208	20949	45409	2	190	2760	2514	5466	30	-	1414	25968	23463	50875
1970	13	-	3	18721	20566	39303	4	353	2046	2614	6017	17	-	356	20767	23180	45320
1971	37	-	197	2735	33824	36793	7	191	1544	1936	3678	44	-	388	4279	35760	40471
1972	36	-	20	6562	27097	33715	4	62	1735	2028	3829	40	-	82	8297	29125	37644
1973	70	-	183	14145	41689	56087	1	48	9	74	132	71	-	231	14154	41763	56219
1974	30	-	3	28340	30173	58546	3	-	967	205	1175	33	-	3	29307	30379	58722
1975	17	-	206	10770	41761	52754	-	1	2011	2025	4037	17	-	207	12781	43786	56791
1976	12	-	1311	24051	30219	55593	-	-	1995	1128	3123	12	-	1311	26046	31347	58716
1977	26	-	426	7928	53912	62292	3	80	703	2915	3701	29	-	506	8631	56827	65993
1978	22	-	94	72033	41462	113611	1	-	2470	1061	3532	23	-	94	74503	42523	117143
1979	75	49	1606	45948	30201	77879	-	845	2546	2840	6231	75	49	2451	48494	33041	84110
1980	36	36	328	10774	52609	63783	12	692	10727	4057	15488	48	36	1020	21501	56666	79271
1981	23	5	13	49755	58323	108119	8	1520	5158	5543	12229	31	5	1533	54913	63866	120348
1982	78	5	4281	39510	51970	95844	7	1289	4752	1868	7916	85	5	5570	44294	53838	103760
5-year avg 1/	36	18	493	37288	47301	85137	5	627	4321	3283	8236	41	18	1121	41608	50585	93373
10-year avg 2/	35	9	419	27031	40745	68238	3	325	2832	2188	5348	38	9	744	29863	42932	73496

1/ 1977- 1
2/ 1972-1981

Appendix Table 4. Commercial and subsistence salmon catches by species by subdistrict, Norton Sound district, 1961- 1982.

	Commercial						Subsistence					Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
							MOSES POINT (SUBDISTRICT 3)										
1962	27	-	-	11100	50683	61810	-	-	-	-	-	27	-	-	11100	50683	61810
1963	15	-	-	2549	46274	48838	5	-	5808	8316	14129	20	-	-	8357	54590	62967
1964	32	3	-	3372	28568	31975	-	-	63	348	411	32	3	-	3435	28916	32386
1965	-	-	-	-	-	-	16	72	1325	9857	11270	16	-	72	1325	9857	11270
1966	17	-	-	2745	24741	27503	14	250	2511	5409	8184	31	-	250	5256	30150	35687
1967	-	-	-	-	-	-	39	116	1322	9913	11390	39	-	116	1322	9913	11390
1968	12	-	1	9012	17908	26933	2	80	6135	2527	8744	14	-	81	15147	20435	35677
1969	29	-	-	11807	26594	38430	9	109	1790	1303	3211	38	-	109	13597	27897	41641
1970	39	-	-	13052	29726	42817	16	160	4661	6960	11797	55	-	160	17713	36686	54614
1971	95	-	4	922	43831	44852	16	271	1046	2227	3560	111	-	275	1968	46058	48412
1972	190	-	11	5866	30919	36986	44	108	1579	2070	3801	234	-	119	7445	32989	40787
1973	134	-	-	10603	31389	42126	2	-	-	298	300	136	-	-	10603	31687	42426
1974	198	-	9	12821	55276	68304	3	-	2382	1723	4108	201	-	9	15203	56999	72412
1975	16	-	-	4407	46699	51122	2	6	1280	508	1796	18	-	6	5687	47207	52918
1976	24	-	232	5072	10890	16218	22	-	5016	1548	6586	46	-	232	10088	12438	22804
1977	96	-	6	9443	47455	57000	22	225	1145	1170	2562	118	-	231	10588	48625	59562
1978	444	-	244	39694	44595	84977	38	407	1995	1229	3669	482	-	651	41689	45824	88646
1979	1035	-	177	40811	37123	79146	16	890	6078	1195	8179	1051	-	1067	46889	38318	87325
1980	502	-	-	1435	14755	16693	131	229	4232	1393	5985	633	-	230	5667	16148	22678
1981	198	-	5	26417	29325	55945	32	2345	6530	2819	11726	230	-	2350	32947	32144	67671
1982	253	-	318	9849	40030	50450	1	1835	3785	3537	9158	254	-	2153	13634	43567	59608
5-year avg 1/	455	-	86	23560	34651	58752	48	819	3996	1561	6424	503	-	906	27556	36212	65176
10-year avg 2/	284	-	68	15657	34843	50852	31	421	3024	1395	4871	315	-	490	18681	36238	55723

1/ 1977-1981
2/ 1972-1981

Appendix Table5 . Commercial and subsistence salmon catches by species by subdistrict, Norton Sound district, 1961-1982.

	Commercial						Subsistence					Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
							NORTON BAY (SUBDISTRICT 4)										
1962	387	7	40	4402	24380	29216	-	-	-	-	-	387	7	40	4402	24380	29216
1963	137	2	-	17676	12469	30284	-	-	5097	-	5097	137	2	-	22773	12469	35381
1964	50	3	-	988	5916	6957	-	-	-	-	-	50	3	-	988	5916	6957
1965	-	-	-	-	-	-	4	22	252	3032	3310	4	-	22	252	3032	3310
1966	-	-	-	-	-	-	7	41	929	3612	4589	7	-	41	929	3612	4589
1967	-	-	-	-	-	-	12	14	1097	2945	4068	12	-	14	1097	2945	4068
1968	-	-	-	-	-	-	28	71	1916	1872	3887	28	-	71	1916	1872	3887
1969	26	-	-	4849	3974	8849	59	189	2115	3855	6218	85	-	189	6964	7829	15067
1970	-	-	-	-	-	-	3	10	840	3500	4353	3	-	10	840	3500	4353
1971	-	-	-	-	-	-	5	47	92	2619	2763	5	-	47	92	2619	2763
1972	43	-	-	1713	7799	9555	30	44	2089	2022	4185	73	-	44	3802	9821	13740
1973	28	-	-	1645	4672	6345	1	-	10	130	141	29	-	-	1655	4802	6486
1974	21	-	-	654	3826	4501	-	-	17	900	917	21	-	-	671	4726	5418
1975	68	-	89	1137	17385	18679	1	-	93	361	455	69	-	89	1230	17746	19134
1976	102	-	95	4456	7161	11814	2	-	41	236	279	104	-	95	4497	7397	12093
1977	158	-	1	2495	13563	16217	14	-	420	2055	2489	172	-	1	2915	15618	18706
1978	470	-	144	8471	21973	31058	12	21	1210	1060	2303	482	-	165	9681	23033	33361
1979	856	-	2547	6201	15599	25203	12	697	735	1400	2844	868	-	3244	6936	16999	28047
1980	340	-	-	47	7855	8242	22	33	4275	1132	5462	362	-	719	5052	16158	22268
1981	63	-	-	177	3111	3351	7	82	2314	3515	5918	70	-	82	2491	6626	9269
1982	96	-	2332	2535	7128	12091	1	1835	3785	3537	9158	97	-	4167	6072	10665	21249
5-year avg 1/	377	-	538	3478	12420	16814	13	167	1791	1832	3803	391	-	842	5415	15687	22330
10-year avg 2/	215	-	288	2700	10294	13497	10	88	1120	1281	2499	225	-	444	3893	12293	16852

1/ 1977-1981
2/ 1972- 1

Appendix Table 6. Commercial and subsistence salmon catches by species by subdistrict, Norton Sound district, 1961-1982.

Year	Commercial						Subsistence					Combined					
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
SHAKTOOLIK (SUBDISTRICT 5)																	
1961	140	-	-	29075	24746	53961	-	-	-	-	-	140	-	-	29075	24746	53961
1962	1738	-	2113	640	8718	13209	-	-	-	-	-	1738	-	2113	640	8718	13209
1963	480	11	563	5138	19153	25345	-	-	-	-	-	480	11	563	5183	19153	25345
1964	631	79	16	1969	35272	37967	77	340	2132	5412	7961	708	79	356	4101	40684	45928
1965	127	30	-	3	8356	8516	31	107	3763	3420	7321	158	30	107	3766	11776	15837
1966	310	-	956	344	8292	9902	142	762	1445	4183	6532	452	-	1718	1789	12475	16434
1967	43	-	88	1050	1655	2836	262	387	2010	4436	7095	305	-	475	3060	6091	9931
1968	61	-	130	2205	2504	4900	10	458	6355	1915	8738	71	-	588	8560	4419	13638
1969	33	-	276	6197	8645	15151	40	193	4018	3439	7690	73	-	469	10215	12084	22841
1970	197	-	155	2301	15753	18406	43	210	2474	2016	4743	240	-	365	4775	17769	23149
1971	284	-	238	28	13399	14949	87	329	494	5060	5970	371	-	567	522	18459	20919
1972	419	-	11	2798	12022	15250	64	235	939	3399	4637	483	-	246	3737	15421	19887
1973	289	-	177	6450	14500	21416	51	130	3410	1397	4988	340	-	307	9860	15897	26404
1974	583	-	179	5650	26391	32803	93	353	1901	358	2705	676	-	532	7551	26749	35508
1975	651	2	812	1774	49536	51963	18	14	1394	334	1760	669	2	826	3108	49870	54535
1976	892	-	129	15803	15798	32622	24	121	1188	269	1602	916	-	250	16991	16067	34224
1977	1521	4	418	7743	36591	46277	49	170	585	2190	2994	1570	4	588	8328	38781	49271
1978	1339	7	1116	46236	35388	84086	81	15	3275	1170	4541	1420	7	1131	49511	36558	88627
1979	2377	-	3383	18944	22030	46734	62	1605	2575	1670	5912	2439	-	4988	21519	23700	52646
1980	1086	-	8001	1947	27453	38488	57	756	3227	1827	5867	1143	1	8757	5174	29280	44355
1981	1484	4	1191	29695	21097	53471	8	525	2225	3490	6248	1492	4	1716	31920	24587	59719
1982	1677	3	22233	17019	26240	67172	68	2138	3865	1165	7236	1745	3	24371	20884	27405	74408
5-year avg.1/	1561	3	2822	20913	28512	53811	51	614	2377	2069	5112	1613	3	3436	23290	30581	58924
10-year avg.2/	1064	2	1542	13704	26081	42311	59	425	2121	2116	4722	1152	2	1991	15822	29537	48610

1/ 1977-1981
2/ 1972-1981

Appendix Table 7. Commercial and subsistence salmon catches by species by subdistrict, Norton Sound district, 1961-1982.

Year	Commercial						Subsistence					Combined					
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
UNALAKLEET (SUBDISTRICT 6)																	
1961	5160	35	13807	5162	23586	47750	-	-	-	-	-	5160	35	13807	5162	23586	47750
1962	5089	-	6739	6769	30283	48880	-	-	-	-	-	5089	-	6739	6769	30283	48880
1963	5941	18	16202	11140	27003	60304	-	-	-	-	-	5941	18	16202	11140	27003	60304
1964	1273	1	79	1	19611	20965	488	2227	7030	6726	16471	1761	1	2306	7031	26337	37436
1965	1321	-	2030	24	26498	29873	521	4562	11488	8791	25362	1842	-	6592	11512	35289	55235
1966	1208	-	4183	5023	16840	27254	90	789	6083	3387	10349	1298	-	4972	11106	20227	37603
1967	1751	-	1544	21961	8502	33758	490	484	9964	-	10938	2241	-	2028	31925	8502	44696
1968	960	-	6549	41474	14865	63848	186	1493	11044	2982	15705	1146	-	8042	52518	17847	79553
1969	2276	-	5273	40558	22032	70139	324	1483	4230	4196	10233	2600	-	6756	44788	26228	80372
1970	1604	-	4261	30779	40029	76673	495	3907	10104	7214	21720	2099	-	8168	40883	47244	98393
1971	2166	-	2688	1196	37543	43593	911	3137	2230	7073	13351	3077	-	5825	3426	44616	56944
1972	2235	-	412	28231	20440	51318	643	1818	3132	4132	9725	2878	-	2230	31363	24572	61043
1973	1397	-	8922	13335	25716	49370	323	213	6233	3426	10195	1720	-	9135	19568	29142	59565
1974	2100	-	1778	93332	36170	133380	313	706	7341	588	8948	2413	-	2484	100673	36758	142328
1975	1638	-	3167	12137	48740	65682	163	74	4758	2038	7033	1801	-	3241	16895	50778	72715
1976	1211	1	5141	37203	24268	67824	142	694	4316	2832	7984	1353	1	5835	41519	27100	75808
1977	2691	1	2781	21001	32936	59410	723	1557	8870	6085	17235	3414	1	4338	29871	39021	76645
1978	7525	5	5737	136200	37079	186546	1044	2538	13268	3442	20292	8569	5	8275	149468	40521	206838
1979	6354	8	23696	49647	30445	110150	640	3330	6960	1597	12527	6994	8	27026	56607	32042	122677
1980	4339	3	21512	203142	64198	293194	1146	4758	19071	5230	30105	5385	3	26270	222213	69428	323299
1981	6157	47	29845	123233	39186	198468	869	5808	5750	4235	16686[3]	7026	71	35650	128983	43421	215154
1982	3768	2	61343	142856	44520	252489	913	7037	20045	4694	32691[4]	4681	4	68380	162901	49214	285090
5-year avg. [1]	5413	13	16714	106645	40769	169554	884	3598	10784	4118	19369	6278	18	20312	117428	44887	188923
10-year avg. [2]	3565	7	10299	71746	35918	121534	601	2150	7970	3361	14073	4155	9	12448	79716	39278	135607

1/ 1977-1981

2/ 1972-1981

3/ include 24 sockeye salmon

4/ include sockeye salmon

Appendix Table 8. Commercial and subsistence salmon catches by species, all subdistricts, Norton Sound district, 1961-1982.

Year	Commercial						Subsistence					Combined					
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
	ALL SUBDISTRICTS																
1961	5300	35	13807	34327	48332	101711	-	-	-	-	-	5300	35	13807	34237	48332	101711
1962	7286	18	9156	33187	182784	232431	-	-	-	-	-	7286	18	9156	33187	182784	232431
1963	6613	71	16765	55625	154789	233863	5	118	16607	17635	34365	6618	71	16883	72232	172424	268228
1964	2018	126	98	13567	148862	164671	565	2567	9225	12486	24843	2583	126	2665	22792	161348	189514
1965	1449	30	2030	220	36795	40524	574	4812	19131	30772	55289	2023	30	6842	19351	67567	95813
1966	1553	14	5755	12778	80245	100345	269	2210	14335	21873	38687	1822	14	7965	27113	102118	139032
1967	1804	-	2379	28879	41756	74818	817	1222	17516	22724	42279	2621	-	3601	46395	64480	117097
1968	1045	-	6885	71179	45300	124499	237	2391	36912	11661	51201	1282	-	9276	108091	57051	175700
1969	2392	-	6836	86949	82795	178972	436	2191	18562	15615	36804	2828	-	9027	105511	98410	215776
1970	1853	-	4423	64908	107034	178218	561	4675	26127	22763	54126	2414	-	9098	91035	129797	232344
1971	2593	-	3127	4895	131362	141977	1026	4097	10863	21815	1/ 37801	3619	-	7224	15758	153177	179778
1972	2938	-	454	45182	100920	149494	804	2319	14158	13966	2/ 31247	3742	-	2773	59340	114886	180741
1973	1918	-	9282	46499	119098	176797	392	520	14770	7185	22867	2310	-	9802	61269	126283	199664
1974	2951	-	2092	148519	162267	315829	420	1064	16426	3958	21868	3371	-	3156	164945	166225	337697
1975	2393	2	4593	32388	212485	251861	186	192	15803	8124	3/ 24305	2579	2	4785	48191	220609	276166
1976	2243	11	6934	87916	95956	193060	203	1004	18048	7718	26973	2446	11	7938	105964	103674	220033
1977	4500	5	3690	48675	200455	257325	846	2530	14296	26607	44279	5346	5	6220	62971	227062	301604
1978	9819	12	7335	325503	189279	531948	1211	2981	35281	12257	51730	11030	12	10316	360784	201536	583678
1979	10706	57	31438	167411	140789	350401	747	8487	25247	11975	46456	11453	57	39925	192658	152764	396857
1980	6311	40	29842	227352	180792	444337	1397	8625	63778	19622	93422	7708	40	38467	291130	200414	537759
1981	7929	56	31562	232479	169708	441734	2021	13416	28741	32866	77082	6/7/ 9950	94	44978	261220	202574	518816
1982	5892	10	91690	230281	183335	511208	1328	17874	56295	23185	98690	6/8 7220	18	109564	286576	206520	609898
5-year avg. 4/	7853	34	20773	200284	176205	405149	1244	7208	33469	20665	62594	9097	42	27981	233753	196870	467743
10-year avg. 5/	5171	18	12722	136192	157175	311279	823	4114	24655	15824	44023	5994	22	16836	160847	171603	355302

1/ Includes 197 recorded sockeye salmon in all subdistricts

2/ Includes 93 recorded sockeye salmon in all subdistricts

3/ Includes 11 recorded sockeye salmon in all subdistricts

4/ 1977-1981

5/ 1972-1981

6/ These figures also include data from Stebbins and St. Michael

7/ Includes 38 sockeye salmon

8/ Includes 8 sockeye salmon

Appendix Table 9. Mean salmon weights, Norton Sound district, 1962-1982. [1/]

Year	Mean round weight in pounds [2/] Chinook	Coho	Pink	Chum
1962	-	-	-	-
1963	-	-	-	-
1964	-	-	-	7.0
1965	-	-	2.3	7.1
1966	-	-	3.5	7.8
1967	23.7	7.0	3.6	7.2
1968	20.0	7.0	4.0	7.5
1969	19.3	7.5	3.6	6.4
1970	16.9	7.7	3.1	6.3
1971	16.8	7.4	3.1	6.4
1972	20.0	7.3	2.8	6.9
1973	20.3	6.8	3.9	7.1
1974	18.2	6.7	3.4	6.6
1975	10.8	7.4	2.9	6.5
1976	15.2	7.2	3.1	7.0
1977	22.7	7.6	3.3	7.0
1978	22.8	6.9	3.6	7.4
1979	22.9	7.1	3.6	7.2
1980	21.5	6.8	3.2	7.2
1981	20.7	6.7	3.5	7.6
1982	16.5	7.1	2.9	7.3

1/ Information not available for some species.
2/ Based on age-weight-length samples or fish tickets

Appendix Table 10. Estimated mean prices paid to salmon fishermen, Norton Sound district, 1962-1982. 1/

Year	Chinook	Coho	Pink	Chum
		Price Per Fish		
1962	$3.85	$ .60	$ .25	$ .35
1963	3.85	.60	.25	.35
1964	4.50	-	.25	.40
1965	3.75	.45	-	.40
1966	4.80	1.05	.25	.65
		Price Per Pound		
1967	.20	.14	.07	.09
1968	.25	.14	.06	.10
1969	.22	.14	.06	.11
1970	.25	.14	.06	.10
1971	.25	.14	.07	.10
1972	.27	.16	.06	.11
1973	.40	.16	.07	.32
1974	.40	.16	.13	.32
1975	.40	.16	.13	.24
1976	.50	.32	.17	.30
1977	.65	.40	.16	.30
1978	.65	.35	.20	.30
1979	.88	.66	.16	.41
1980	.74	.63	.07	.23
1981	$1.25	.62	.13	.26
1982	$1.25	.57	.12	.32

1/ Information is not available for some species.

Appendix Table 11. Dollar estimates of Norton Sound district commercial salmon fishery, 1961-1982.

Year	Gross value of catch to fishermen	Wages earned [2]	Total income to district	Wholesale value of pack [3]	License and tax revenues to State (license fees only)
1961	$ [1]	[1]	$ [1]	$ [1]	$ 2,010.00
1962	105,800.00	[1]	[1]	510,900.00	16,341.00
1963	104,000.00	[1]	[1]	487,500.00	18,009.00
1964	51,000.00	[1]	[1]	306,700.00	11,305.00
1965	21,483.00	[1]	[1]	91,906.00	5,084.00
1966	68,000.00	[1]	[1]	199,000.00	4,680.00
1967	44,038.00	58,000.00	102,038.00	140,000.00	3,500.00
1968	63,700.00	[1]	[1]	133,166.00	4,000.00
1969	95,297.00	72,145.00	167,442.00	[1]	[1]
1970	99,019.00	55,100.00	154,119.00	[1]	5,595.00
1971	101,000.00	65,500.00	166,500.00	[1]	5,730.00
1972	102,225.00	68,700.00	170,925.00	[1]	7,000.00
1973	308,740.00	81,000.00	389.740.00	[1]	15,400.00
1974	437,127.00	129,600.00	565,727.00	[1]	20,028.00
1975	413,255.00	172,800.00	586,055.00	[1]	28,230.00
1976	285,283.00	[1]	[1]	600,000.00 [4]	10,133.00
1977	528,610.00	[1]	[1]	[1]	11,386.00
1978	814,221.00	[1]	[1]	[1]	12,002.00
1979	876,547.80	[1]	[1]	[1]	11,780.00
1980	583,388.00	[1]	[1]	[1]	11,640.00 [5]
1981	758,471.00	[1]	[1]	[1]	11,940.00
1982	988,588.00	[1]	[1]	[1]	7,155.00 [5/6]

[1] Information not available

[2] Includes wages paid to tender boat operators, processing plant employees in district

[3] Based on type of processing when pack is shipped from the district.

[4] Estimate based on data from two buyers.

[5] Includes only permit renewals and vessel license fees.

[6] The Alaska state legislature lowered all resident permit renewal fees and vessel license fees to poverty level fees for 1982.

Appendix Table 12. Round weight of commercially caught salmon by species, Norton Sound district, 1961-1982.

Year	Pounds caught (round wt. in lbs) Chinook	Coho	Pink	Chum	Salmon roe (lbs)
1961 1/	120,405	96,649	102,711	347,990	
1962 1/	157,000	-	10,569	221,645	
1963 1/	89.700	51,750	-	-	
1964 1/	39,169	686	-	249,890	
1965	33,327	14,210	660	264,924	2/
1966	35,259	40,285	38,334	577,764	16,901
1967	41,854	15,944	100,913	289,473	21,429
1968	22,954	50,665 3/	250,044 4/	306,871 5/	20,381
1969	51,441	6/ 50,461	312,836 7/	529,235 8/	5,578
1970	38,103	25,000	156,313	610,588	1,345
1971	43,112	22,078	15,377	857,014	1,122
1972	57,675	3,257	133,389	710,853	1,083
1973	38,935	63,812	185,799	845,596	2/
1974	54,433	15,023	511,737	1,082,575	39,876
1975	25,964	32,345	87,586	1,318,111	46,470
1976	34,095	49,822	271,867	669,728	2/
1977	102,341	28,254	162,457	1,415,981	2/
1978	222,974	50,872	1,164,174	1,389,806	2/
1979	231,988	251,129	598,785	1,001,548	2/
1980	135,646	204,498	719,368	1,301,693	2/
1981 9/	164,182	212,065	719,102	1,284,193	2/
1982 9/	97,255	648,212	659,171	1,338,788	95

1/ Does not include canned salmon cases (48#)
1962: 29 chinook, 883 coho, 927 pink, 12,459 chum
1963: 604 chinook, 808 coho, 1918 pink, 13,308 chum
1964: 75 chinook, 452 pink, 9,357 chum

2/ Information not available
3/ Includes about 48,000 lbs of salted fish
4/ Includes about 150,000 lbs of salted fish
5/ Includes about 150,000 lbs of salted fish
6/ Includes about 598 lbs of salted fish
7/ Includes about 48,092 lbs of salted fish
8/ Includes 117,664 lbs of salted fish
9/ Preliminary data

Port Clarence District

District Boundaries

The Port Clarence district encompasses all waters from Cape Douglas north to Cape Prince of Wales including the Salmon Lake and Pilgrim River drainages (Figure 2). Salmon, saffron cod, whitefish, and herring are the major subsistence species; however, other fishery resources are also utilized.

Commercial Fishery

Commercial salmon fishing is now prohibited. In 1966 a total of 1,216 salmon consisting of 93 sockeyes, 131 pinks and 992 chums was taken commercially in the Grantley Harbor/Tuksuk Channel area. This was the only bona fide commercial fishery, but a few salmon are sold or bartered each year in Teller and Nome. Due to the relatively small runs in this area and the existance of an important subsistence fishery, commercial salmon fishing has not been reopened.

Subsistence Fishery

A traditional subsistence salmon fishery has probably occurred within this district for centuries; however, subsistence fishing within Salmon Lake and upper Pilgrim River has only been known to occur since the 1930's and 1962 respectively. Data collected by Department personnel has indicated a majority of the fishermen of Brevig Mission fish the northern and northeastern sections of Port Clarence, while Teller fishermen utilize Grantley Harbor and Tuksuk Channel (Figure 2). Interviews with local residents have also indicated substantial fishing effort within the Agiapuk River. Salmon Lake and Pilgrim River stocks have been utilized primarily by Nome residents. However, in light of a declining sockeye salmon population, the Alaska Board of Fisheries in 1972 adopted a regulation closing Salmon Lake and it's tributaries to subsistence salmon fishing from July 15 through August 31. Two subsistence permits issued to Nome residents in 1982 for the Pilgrim River were not utilized.

Personal interviews of fishermen seem to indicate a decline in subsistence fishing effort, due primarily to the absence of younger fishermen entering the fishery. A majority of the subsistence fishing effort appears to be conducted by elder residents who gathered fish for an entire family.

Twentyseven Brevig Mission-Teller fishermen reported taking 5,557 salmon. Species composition was 23 chinook, 405 sockeye, 4,345 pink, 684 chum salmon and 100 coho (Appendix Table 13). The 1981 annual management report breaks down yearly catches by village. Several subsistence fishermen interviewed in Brevig Mission reported that they gave up fishing earlier than usual due to dirty water which filled their nets with weeds. These fishermen stated that they did not get enough fish for the winter for this reason.

Most Teller fishermen reported adequate catches with good weather for drying. A few complained that the hot weather dried the fish too fast, and others said the fly problem was worse than last year. A few known subsistence fishermen were unavailable for interviews because of a village meeting that was being held.

Escapement

Aerial surveys were not flown in this district due to poor weather and due to the lower priority assigned to districts which do not support commercial fisheries.

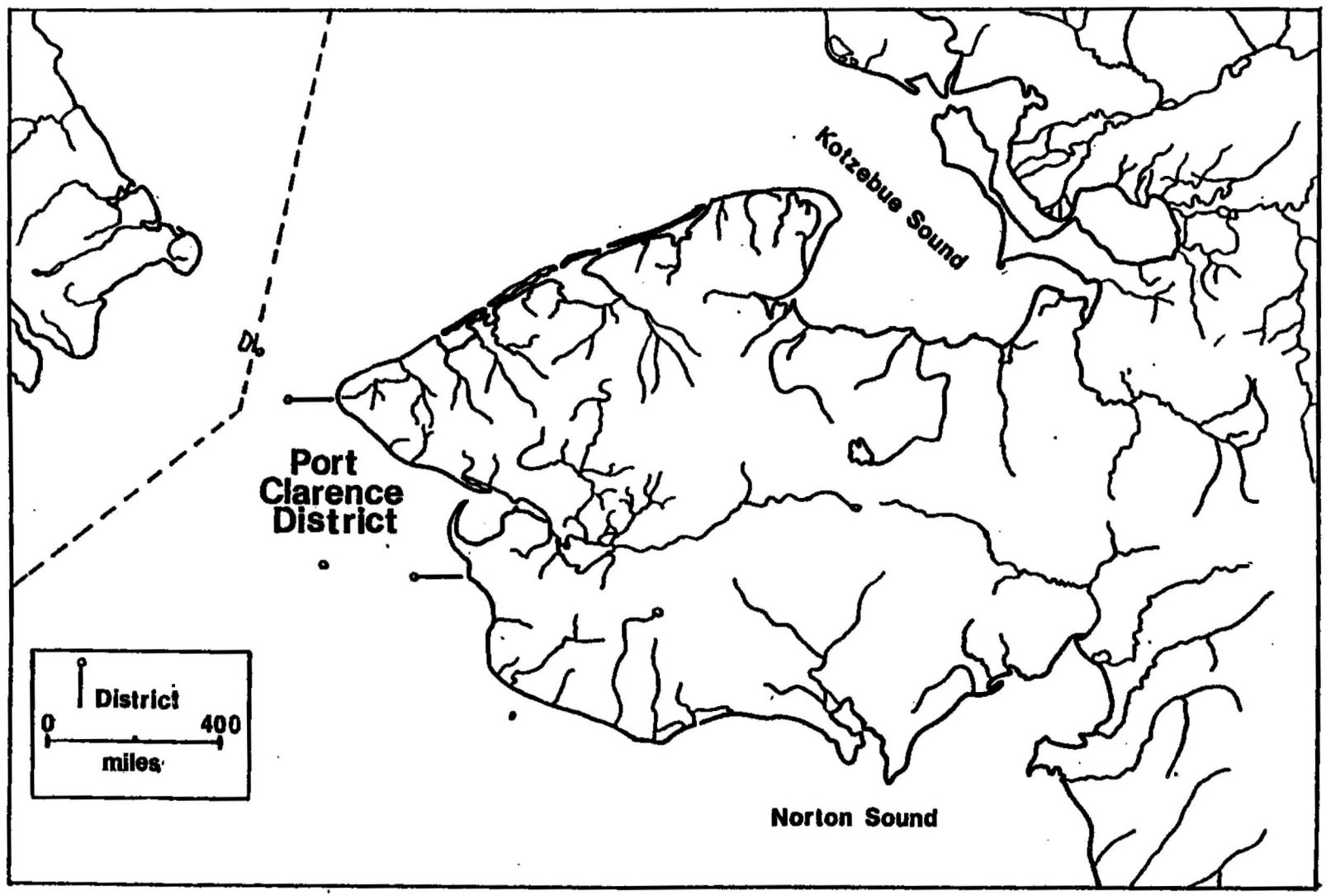


Figure 2. Port Clarence district

Appendix Table 13. Subsistence salmon catches for Port Clarence district, (1963-1982).

Year	Families Fishing	Chinook	Sockeye	Coho	Pink	Chum	Total
1963	19	9	4,866	25	1,061	1,279	7,440
1964	22	17	1,475	227	371	1,049	3,139
1965	29	36	1,804	639	1,854	1,602	5,935
1966	26	10	1,000	896	859	2,875	5,640
1967	19	12	2,068	232	767	1,073	4,152
1968	24	40	688	133	1,906	904	3,671
1969	13	2	180	27	548	932	1,582
1970	18	4	588	1,071	1,308	4,231	7,202
1971	22	31	850	959	1,171	3,769	6,780
1972	8	4	68	388	75	2,806	3,341
1973	4	22	46	280	424	1,562	2,334
1974	13	0	28	62	14	2,663	2,767
1975	17	0	244	5	743	1,589	2,581
1976	15	7	291	20	436	6,026	6,780
1977 1/	13	-	-	-	-	-	5,910
1978	26	1	392	0	7,783	705	8,881
1979	26	0	320	35	741	1,658	2,720
1980	22	7	3,195	5	3,170	1,715	8,092
1981	10	8	255	110	765	5,845	6,983
1982	27	23	405	100	4,345	684	5,557

1/ species composition estimated at 75% chum, 10% pink, 10% sockeye, and 5% chinook and coho combined.

KOTZEBUE DISTRICT

District Boundaries

The Kotzebue district includes all waters from Cape Prince of Wales north to Point Hope (Figure 3).

Commercial Fishery

Commercial salmon fishing in the Kotzebue district dates back to the 1914-1918 period when the Midnight Sun Packing Company processed 10,130 cases (48 one-pound cans) and 300 barrels of hard salt salmon in the vicinity of Kotzebue. It is assumed that the salmon processed were chum.

The next commercial effort was not made until 1962 which resulted in a harvest of 130,075 salmon. The catches from 1962-1982 are presented in Appendix Table 14.

All commercial fishing effort is concentrated near the village of Kotzebue. Fishermen can legally operate set gill nets of up to 150 fathoms. Open skiffs powered by outboard motors are used to operate the fishing gear and deliver the fish to buyers.

Department tagging studies have indicated that the bulk of the fish returning to this district are bound for the Kobuk and Noatak Rivers. Commercial fishing is therefore limited to an area near Kotzebue to prevent establishment of a cape fishery which would intercept salmon bound for other streams.

The Kobuk River chum salmon run has been identified as arriving in this district first, peaking in the commercial fishery sometime between July 17 and July 28. However, a segment of this run, bound for the upper part of the Kobuk River, passes through the commercial fishing district during middle to late August. These returns are important, not only to the commercial fishery near Kotzebue, but to residents of the five villages along the Kobuk River which utilize salmon for subsistence purposes. Keeping this is mind, the Department has attempted to restrict commercial fishing time for those years of low salmon abundance and/or an increased fishing effort while the Kobuk River run is passing through the fishery.

The larger Noatak River chum salmon run follows the Kobuk River run, peaking during August 1 through August 14. Escapements to this system are monitored not only by aerial surveys conducted during the fishing season, but by a Department sonar counter operated in the lower Noatak River.

Returns to both the Noatak and Kobuk Rivers may be expected to exhibit large fluctuations in run magnitude, since Kotzebue district chum salmon occur in the northern limits of the range for this species.

The Kotzebue commercial salmon fishery averaged 85,008 chum salmon during 1962-1972. Due to apparent excellent brood year survival rates, returns were above average during 1973-1975 and commercial catches averaged 524,531 chum salmon. During 1976-1979, returns were more similar to prei973 levels, with 1978 commercial catches decreasing to the lowest level recorded since 1969 and escapements dropping to the lowest levels ever recorded. In an effort to protect the smaller Kobuk River chum salmon run and ensure adequate salmon for subsistence purposes, the Board of Fisheries passed two regulations at their December, 1978 meeting:

1. The opening date of the commercial salmon season was changed from July 1 to July 10 to reduce the harvest of the Kobuk River run.
2. Commercial periods were amended from two 48-hour period per week to provide for emergency order openings/closures during July and a reduction in fishing time during August to two 36 hour periods per week.

In addition, the Department formulated a management plan which provided for initial commercial periods in July to be of 24-hour duration unless comparative commercial catch data indicated above average returns.

Although the fishery was below average again in 1979, the catch of salmon during 1980 was well above average and a record catch of 677,239 chum salmon was taken in 1981 (Appendix Table 14). This large catch was attributed primarily to Noatak River stocks, and Kobuk River escapements remained average to below average during these years. In light of increasing commercial fishing effort, the continuance of the management restrictions adopted in 1978 to protect the Kobuk River stocks are still necessary.

Commercial Fishery 1982

One hundred and ninety-nine fishermen sold 51 chinook, 2 pink, and 417,790 chum salmon during 1982. The chum salmon harvest was the fourth largest on record and was 40 percent greater than the recent five year average annual harvest of 298,699 fish (Table 11, Appendix Table 14).

The catch was purchased by 5 buyers. Two buyers iced their fish and flew them from the district. One buyer gilled and gutted fish and flew them from the district. Another buyer gilled and gutted fish and sold them to a second company that froze them on a freezer ship located within the district. One buyer froze fish on a freezer ship in the district. When compared to past years, increased amounts of fish processing occurred within the district, resulting in additional local jobs and an increased boost to the local economy.

To allow for the normal scheduling of weekly periods, the 1982 commercial fishery began on July 8. During July, comparative commercial catch statistics indicated that the Kotzebue chum salmon run was of average strength. Commercial fishing time was not adjusted until August 1, when fewer Kobuk River salmon are present in the fishing district. At that time, commercial fishing periods were lengthened to 36 hours in duration. A dramatic increase in the catch during the first period in August (August 2 through 4) combined with a moderate increase in Noatak River sonar counts, indicated that the Noatak River run had begun and was well above average in strength. Commercial fishing time was increased to two 48 hour periods per week on August 5 and remained of that duration during the rest of the active fishing season. After August 27, processors ceased buying operations. The fishery closed by regulation on August 31.

A total of 3,833,051 pounds of chum salmon was purchased. The total value of the catch, including incidentally caught and sold char, sheefish, and other species of salmon was worth approximately 1,961,518.00 dollars (Appendix Tables 15and 16) which is the second most valuable catch on record. Chum salmon averaged 9.3 pounds in weight, and fishermen were paid an average price of $0.51 per pound for this species (Appendix Table 17).

Subsistence Fishery

Subsistence salmon fishing has long been an important food gathering activity for the Eskimo people of the Kotzebue district. Remnants of salmon spears and nets have been found in old village sites on the Kobuk River that date back to 1250 A.D. At present, subsistence fishermen use set gill nets and beach seines to catch salmon in the bays and rivers. Nearly all of the catch is consumed as dried fish.

It is difficult to calculate the value of the subsistence fishery in terms of dollars to the residents of this area. However, if subsistence fishermen had to purchase a protein food in the place of their subsistence salmon catch, the dollar value of this fishery would be considerable.

Available subsistence chum salmon catches are presented in Appendix Tables 18 and 19. The 1957 studies of Raleigh document estimates of average annual subsistence catches for recent years prior to 1957. The methods and completeness of this survey were not fully documented. The catch estimates were obtained from interviews of a certain percentage of each village population. The interview data was then expanded to include the entire village. Possible large errors in the estimation of total catches could have occurred.

Catches during the period 1962-1982 were obtained by the Alaska Department of Fish and Game. The catches were tabulated by direct counts of salmon, interviews, or by the return of catch forms that were distributed to fishermen. Since not all fishermen are interviewed or respond to questionaires, these catch figures should be considered minimum estimates.

During 1982 the Department intensified efforts to gather information on the subsistence harvest of salmon in Kotzebue Sound. An effort to compile a list of fishing families in each village was initiated and in June survey forms were mailed out to fishermen in all villages of the region with the exception of Kobuk and Candle. Department personnel conducted personal interviews of subsistence fishermen in all villages on the Kobuk and Noatak Rivers, and in Kotzebue, Deering and Selawik, in an effort to compile information on the harvest of salmon and other fish species. Interviews were also conducted at fish camps along the upper Kobuk River above Kobuk and in the Kobuk River Delta area. Interviews were timed to occur immediately after the majority of subsistence harvest had taken place. Two trips to the village of Noatak were conducted when it became apparent during the first interviews on September 21 that not all the intended subsistence effort had occurred.

Subsistence fishermen, especially those from Noatak, were plagued with rain and high water which resulted in poor fishing and fish drying conditions. Catches of salmon were low and a considerable number of dried salmon were lost to spoilage. Many fishermen intended to increase their harvest effort of other species of fish to help compensate for the low salmon harvest. As a result, fishing effort for sheefish on the Kobuk River and arctic char in the Noatak River were probably higher than usual during the fall.

The reported catches by subsistence fishermen during the months of May thru October are presented in Table 12. Not all known subsistence fishermen were contacted and village catches were extrapolated to estimate the total subsistence harvest (Table 13). The reported subsistence catch

of chum salmon in the Kotzebue District was 30,133 fish while the extrapolated estimate of the total subsistence catch was 33,585 fish (Table 13). The extrapolated catch was estimated by determining what percentage of the harvest was not reported using a ratio of the uninterviewed fishermen to total fishermen. The reported harvest was then expanded by this ratio to reflect the total extrapolated harvest. This figure should be considered conservative since not all uninterviewed fishermen were identified.

Escapements

An average Kobuk River escapement was documented by aerial surveys in 1982 (Appendix Table 20). Smaller than average peak aerial survey counts in the lower Kobuk tributaries (Salmon and Squirrel Rivers) were offset by above average counts in the upper Kobuk River. For the first time a counting tower project was operated on the Squirrel River and a resultant count of 9,500 chums obtained. The tower count compared favorably to a peak aerial survey count of 7,690.

For the third consecutive season, two sonar units were operated from each bank of the lower Noatak River in an attempt to enumerate the total spawning population in this system. There have been problems to date in establishing the accuracy of the sonar count due to presence of other species (pink salmon, char, whitefish) in the counts and unknown numbers of mid-stream migrants that are beyond sonar range. Although total escapement data is not available, a minimum estimate of 92,000 chum salmon were counted by sonar in 1982. An above average peak aerial survey count of 11,600 chums was obtained for the Kelly River, a Noatak River tributary. Aerial surveys of the main river were severely limited by inclement weather and turbid waters. The limited escapement data available coupled with the relatively high catch per unit effort in the commercial fishery are indicators that at least an average escapement was obtained for the Noatak River during 1982.

Kotzebue District Outlook for 1983

Since the creation of the Kotzebue Sound Chum Forecast project in 1978, three different techniques have been used to predict the annual chum salmon run.

The first technique used only key environmental parameters that effect the survivorship from emergent fry to returning adult. Although good correlations between run magnitude and these parameters were found, baseline data for this method proved difficult to collect or find. This method was used to predict the 1980 chum run.

Predictions for the 1981 and 1982 seasons were based on survivorship similarities from egg to returning adult of the different age classes resulting from a single brood year. For example, high survival of three year old fish returning in 1982 should indicate a high survival of four year old fish returning in 1983. (Both age classes resulted from the 1979 escapement). This method required an estimation of the mean number of eggs per female in the three age classes which then multiplied by the number of females in each age class in the escapement to produce an estimate of the total potential spawn. This forecasting method performed very well for the 1982 return, which was predicted to reach 629,000 fish compared to an actual estimated return of 601,000 fish.

In 1982 it was found that the mean number of eggs per age class used to derive total potential spawn were strikingly similar and, when multiplied by an estimate of female escapement (which was always close to 50%), essentially involved the use of constants. Therefore the use of egg numbers in the forecast technique was dropped for the 1983 forecast.

The forecast for 1983 is very similar in technique to that used in 1981 and 1982. Both methods are based on similarities in survivorship between age classes, but the 1983 forecast is based on survivorship from total escapement to returning adults.

The projected 1983 chum return of 530,000 is expected to be average. The three age classes will be the results from escapements during 1978-1980 . Escapements in 1978 and 1979 were both low and will probably result in poor returns of four and five year old fish, respectively. The three year old portion of the 1983 returns are the result of a very strong escapement in 1980. The total return in 1983 is expected to be comprised of 120,000 three year olds, 300,000 four year olds and 110,000 five year old chum. If the forecast is accurate and escapement goals are met, a commercial harvest of 339,000 chum salmon can be expected, which would be the 7th largest on record but below the last three year's harvest.

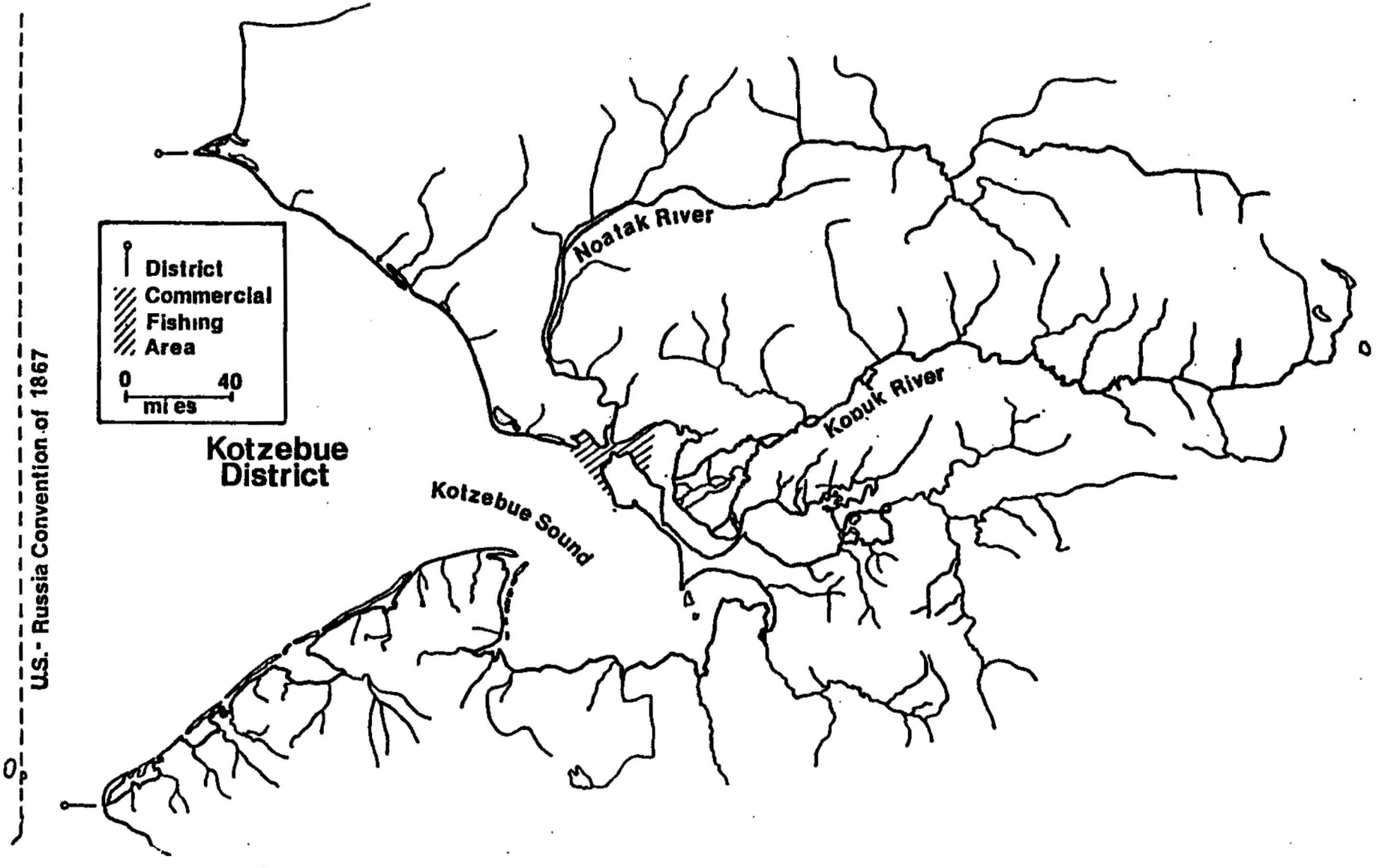


Figure 3. Kotzebue district.

Table 11. Commercial salmon catches from the Kotzebue district (331), set gill nets, 1982

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Pink	Chum	Cumulative catch Chinook	Pink	Chum
7/8	6	-	0	2	858	0	2	858
7/9	18	-	1	0	3345	1	2	4203
	24	59	1	2	4203 (2.97)			
7/12	6	-	0	0	440	1	2	4643
7/13	18	-	0	0	5525	1	2	10168
	24	99	0	0	5965 (2.54)			
7/15	6	-	0	0	1016	1	2	11184
7/16	18	-	1	0	6475	2	2	17659
	24	117	1	0	7491 (2.67)			
7/19	6	-	0	0	2383	2	2	20042
7/20	18	-	1	0	13324	3	2	33366
	24	158	1	0	15707 (4.14)			
7/22	6	-	0	0	4490	3	2	37856
7/23	18	-	3	0	16241	6	2	54097
	24	163	3	0	20731 (5.30)			
7/26	6	-	0	0	2320	6	2	56417
7/27	18	-	0	0	6269	6	2	62686
	24	134	0	0	8589 (2.67)			
7/29	6	-	1	0	7069	7	2	69755
7/30	18	-	11	0	40931	18	2	110686
	24	166	12	0	48000 (12.05)			
8/2	4	-	1	0	13785	19	2	124471
8/3	24	-	0	0	63211	19	2	187682
8/4	8	-	3	0	22224	22	2	209906
	36	179	4	0	99220 (15.40)			

Table 11. Commercial salmon catches from the Kotzebue district (331), set gill nets, 1982 (continued)

Date of Landing	Hours Fished	Number Boats	Total catch (catch/boat hour) Chinook	Pink	Chum	Cumulative catch Chinook	Pink	Chum
8/5	6	-	0	0	11239	22	2	221145
8/6	24	-	3	0	32284	25	2	253429
8/7	18	-	1	0	24899	26	2	278328
	48	179	4	0	68422 (7.96)			
8/9	6	-	1	0	9491	27	2	287819
8/10	24	-	2	0	30837	29	2	318656
8/11	18	-	2	0	25334	31	2	343990
	48	183	5	0	65662 (7.48)			
8/12	6	-	0	0	1343	31	2	345333
8/13	24	-	2	0	6268	33	2	351601
8/14	18	-	4	0	9427	37	2	361028
	48	147	6	0	17038 (2.41)			
8/16	6	-	0	0	3748	37	2	364766
8/17	24	-	4	0	15193	41	2	379969
8/18	18	-	1	0	9672	42	2	389641
	48	164	5	0	28613 (3.63)			
8/19	6	-	0	0	2314	42	2	391955
8/20	24	-	4	0	9483	46	2	401438
8/21	18	-	0	0	4586	46	2	406024
	48	156	4	0	16383 (2.19)			
8/22	6	-	2	0	2278	48	2	408302
8/23	24	-	1	0	2577	49	2	410879
8/24	18	-	2	0	3328	51	2	414207
	48	94	5	0	8183 (1.81)			
8/26	6	-	0	0	100	51	2	414307
8/27	24	-	0	0	2053	51	2	416360
8/28	18	-	0	0	1430	51	2	417790
	48	52	0	0	3583 (1.44)			

Table 12. Reported subsistence catches of salmon during the period of May through October, 1982.

Village	# of fishermen Interviewed	Reported Subsistence Catches				
		Chinook	Sockeye	Coho	Pink	Chum
Kobuk	3	0	0	0	0	600
Shungnak	16	0	0	0	0	4191
Ambler	15	0	0	0	0	2506
Kiana	20	0	0	0	32	4918
Noorvik	23	0	0	0	489	7433
Kobuk River Totals	77	0	0	0	521	19648
Noatak	29	2	0	0	3	5479
Kotzebue/ Sheshalik	49	0	5	0	126	4099
Selawik	4	0	0	0	0	0
Deering	10	0	0	135	2	807
Kivalina	35	0	0	0	0	100
Kotzebue District Totals	204	2	5	135	652	30133

Table13. Estimates of subsistence catches of chum salmon by village, 1982.

Village	# of fishermen interviewed	# of known fishermen not contacted	Reported Catch/ Fisherman	Chum Salmon Catch Average catch	Extrapolated catch Estimate
Kobuk	3	0	600	200	600
Shungnak	16	1	4191	262	4453
Ambler	15	2	2506	167	2840
Kiana	20	6	4918	246	6393
Noorvik	23	0	7433	323	7433
Kobuk Totals	77	9	19648	-	21719
Noatak	29	2	5479	189	5856
Kotzebue/ Sisolik	49	12	4099	84	5103
Selawik	4	0	0	0	0
Deering	10	0	807	81	807
Buckland	0	0	-	-	-
Shishmaref	0	0	-	-	-
Kivalina 1/	35	0	100	3	100
Kotzebue District Totals	204	23	30133	-	33585

1/ Data from Stephen Braund and Associates

Appendix Table 14. Comparative commercial chum salmon catch statistics, Kotzebue district, 1962-1982.

	1962	1963	1964	1965	1966	1967	1968 1/	1969	1970	1971
Total Catch	129,948	54,445	76,499	40,025	30,764	29,400	30,199	59,335	159,664	154,956
Total Days 2/	21	20	27	32	35	33	29	40	32	29
Total boat days 3/	793	693	560	410	548	410	634	800	1,368	1,393
Average seasonal catch/boat day	164	79	137	98	56	72	48	74	117	111
No of fishermen 4/ making at least 1 delivery	84	61	52	45	44	30	59	52	82	87
Average seasonal catch per fishermen	1,547	893	1,471	889	699	980	512	1,141	1,947	1,781

1/ Does not include catches made after September 1
2/ Day = 24 hours of open fishing time
3/ Boat days = boats x hours fished ÷ 24 hours.
4/ During 1962 through 1966 and 1968 through 1971, figures represent the number of vessels licensed to fish in Kotzebue Sound, not the number of fishermen.

Appendix Table 14.(cont.) Comparative commercial chum salmon catch statistics, Kotzebue district, 1962-1982.

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total Catch	169,664	375,432	627,912	563,345	159,656	195,895	111,533	141,545	367,284	677,239	417,790
Total days 2/	35	25	32	39	16	21	23	21	27	27	23.5
Total Boat Days 3/	3,666	3,663	5,948	10,480	3,520	4,704	2,738	3,891	2,634	3,336	3,116
Average seasonal catch/boat day	46	103	106	54	45	42	41	36	139	203	134
No. of fishermen 4/ making at least 1 delivery	104	148	185	224	220	224	208	181	176	187	199
Average seasonal catch per fishermen	1,631	2,537	3,394	2,515	726	875	536	782	2,087	3,622	2,099

1/ Does not include catches made after September 1.
2/ Day = 24 hours of open fishing time.
3/ Boat days = boats x hours fished ÷ 24 hours.
4/ During 1962 through 1966 and 1968 through 1971 figures represent the number of vessels licensed to fish in Kotzebue Sound, not the number of fishermen.

Appendix Table 17. Estimated mean prices paid to salmon fishermen by species, Kotzebue district, 1962-1982.[1/] [4/]

Year	Chum		Whitefish	Inconnu	Char
	av. round weight	average price			
1962 [3/]	-	$0.35	$	$	$
1963 [3/]	-	0.35			
1964 [3/]	8.3	0.45			
1965 [3/]	9.0	0.45	0.25	1.30	
1966	10.1	0.11	0.25 [3/]	1.40 [3/]	0.55 [3/]
1967	9.3	0.11	0.25 [3/]	1.50 [3/]	0.75 [3/]
1968	9.7	0.14		0.91 [3/]	0.98 [3/]
1969	7.5	0.15		1.30 [3/]	2.84 [3/]
1970	8.1	0.15			
1971	8.1	0.16		0.16	0.17
1972	9.1	0.17		0.20	0.17
1973	9.1	0.25		0.30	0.16
1974 [2/]	8.5	0.34		0.30	0.16
1975 [2/]	8.6	0.28		0.30	0.30
1976	8.9	0.41		0.30	0.30
1977	9.6	0.56		0.30	
1978	9.1	0.57		0.30	0.25
1979	8.8	0.80			0.25
1980	8.6	0.46		0.10	0.20
1981	9.1	0.53		0.75 [5/]	0.17
1982	9.3	0.51		0.75 [5/]	0.20

1/ Information not available for some species
2/ Includes price paid to fishermen of Deering during experimental commercial fishery
3/ Price per fish
4/ Figures from previous reports recomputed to yield price per pound.
5/ Limited market with one buyer

Appendix Table 18. Mean Subsistence chum salmon catch per fisherman, Kotzebue district, 1962-1982.

Village	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Kotzebue	2/	650	515	400	158	202	135	98	187	53
Noatak	1190	800	710	810	820	914	220	760	242	148
Noorvik	665	160	220	220	137	90	84	163	132	223
Kiana	350	3/	260	265	62	68	96	223	138	207
Ambler	2/	94	310	190	76	49	33	235	242	177
Shungnak	2/	3/	2/	220	45	125	114	318	182	133
Kobuk	335	67	205	145	104	35	206	206	150	386

Village	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Kotzebue	63	195	2/	2/	2/	2/	2/	2/	2/	213	84
Noatak	74	36	393	138	212	425	79	114	164	579	189
Noorvik	84	121	324	210	259	56	88	98	318	388	323
Kiana	84	178	181	288	79	38	71	68	213	131	246
Ambler	244	305	165	282	250	55	131	160	132	129	167
Shungnak	266	489	891	647	281	104	265	184	246	233	262
Kobuk	302	273	450	293	70	41	142	108	88	317	200
Deering	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	81

1/ No household survey; information from return of mail questionnaires
2/ Not surveyed
3/ Number of fishermen unknown.

Appendix Table 19. Kotzebue district subsistence chum salmon catches, 1962-1982.

Village	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Noorvik	15,934	4,304	2,167	5,596	3,141	2,350	2,424	1,301	6,077	7,144
Kiana	3,139	1,973	783	1,598	433	1,489	2,488	2,458	3,457	5,177
Ambler	1/	755	2,142	1,340	912	679	457	3,525	2,899	2,299
Shungnak	1/	1,240	3,134	2,160	899	1,500	1,600	2,550	3,450	2,653
Kobuk	2,321	200	1,020	877	625	175	1,030	1,655	600	1,931
Kobuk River TOTAL	21,393	8,472	9,246	11,571	6,010	6,193	7,999	11,489	16,483	19,204
Noatak River TOTAL2/	48,890	16,762	12,763	5,671	19,700	26,512	5,490	14,458	4,120	9,919
Kotzebue	-	5,835	7,753	8,058	3,640	4,032	4,324	1,768	6,184	1,737
Deering	-	-	-	5,200	6,238	3,098	2,838	1,897	1,242	763
Buckland	-	-	-	-	-	162	37	-	344	155
Candle	-	-	-	-	-	11	89	200	113	50
Shishmaref	-	-	-	-	-	100	37	-	-	131
DISTRICT TOTAL	70,283	31,069	29,762	30,500	35,588	40,108	20,814	29,812	28,486	31,959

1/ Not surveyed
2/ Represents catches of the village of Noatak; 40,693 chums taken during 1961.

Appendix Table19. Kotzebue district subsistence chum salmon catches, 1962-1982.
(continued)

Village	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982 5/
Noorvik	1774	2312	6809	4620	1555	891	2034	2155	2229	3488	7433
Kiana	1435	4470	2726	4320	1579	766	1493	1225	2551	1439	4918
Ambler	1469	1529	1651	3390	2000	385	2224	2400	660	782	2506
Shungnak	2665	4406	6243	9060	4213	1760	4766	2947	2704	2800	4191
Kobuk	2119	1917	2251	1755	562	325	852	651	350	950	600
Kobuk River TOTAL	9462	14634	19680	23145	9909	4127	11369	9378	8500	9449	19648
Noatak River TOTAL	741	216	4330	1515	4448	2125	1495	2227	2135	5465	5479
Kotzebue	1151	1172	2/	2/	2/	2/	2/	2/	2/	2387	4099
Deering	369	1098	1880	1175	1358	3500	2/	2000	2/	295	807
Kivalina	2/	2/	2/	2/	2/	2/	2/	2/	2/	110	100
Buckland	59	1722	639	1540		2/	2/	1000	2/	50	2/
Candle	113	50	15	2/	2/	2/	50	2/	2/	2/	2/
Shishmaref	29	100	200	230		2/	2/	2/	2/	2/	2/
DISTRICT TOTAL	11085	18942	26729	27605	15765	9752	12864	14605	10635 1/3/	17876 1/	30133

1/ No household survey; information from return of mail questionnaires
2/ Not surveyed
3/ Does not include 310 chum taken in Selawik
4/ Does not include 110 chum salmon taken in Kivalina
5/ Reported catches (not all known fishermen were contacted).

Appendix Table 15. Salmon pack by species and type of processing Kotzebue district, 1962 - 1982 1/

Year	Cases (48. lb) Chum	Fresh-Frozen (rnd. wt. in lbs.) Chum	Other 4/	Salmon roe(lbs) Fresh-Frozen	Cured
1962	14,500	-	-	-	-
1963	5,396	-	-	-	-
1964	5,421	202,993	-	-	-
1965	1,929	207,350	-	-	-
1966	-	310,716	-	13,600	3,065
1967	-	273,420	-	-	11,488
1968	-	288,500	-	-	11,850
1969	-	455,013	-	-	8,183
1970	-	1,240,000	-	-	48,377
1971	-	1,264,753	-	-	27,542
1972	-	1,547,041	-	-	55,376
1973	-	3,416,431	-	-	144,768
1974	-	5,361,130 2/	-	-	-
1975	-	4,877,313 3/	-	-	-
1976	-	1,415,549	487	-	-
1977	-	1,846,340	1,075	-	-
1978	-	1,009,121	32,419	-	-
1979	-	1,236,429	6,155	-	-
1980	-	3,160,984	7,828	-	-
1981	-	6,139,518	2,210	-	-
1982	-	3,833,051	790	100	-

1/ Pack represents type of processing when fish were shipped out of district.
2/ Includes 36,775 lbs from the experimental commercial fishery at Deering.
3/ Includes 80,801 lbs from the experimental commercial fishery at Deering.
4/ Chinook and pink salmon

Appendix Table 16. Dollar value estimates of Kotzebue district commercial fishery, 1962-1982. 7/

Year	Gross Value of catch to fishermen	Wages Earned 1/	Total Income to District	Wholesale Value of pack 2/	License and tax revenues to State
1962	$45,500.00	$ 3/	$ 3/	$304,500.00	$11,635.00
1963	9,140.00	3/	3/	113,316.00	6,040.99
1964	34,660.00	3/	3/	158,020.00	5,279.00
1965	18,000.00	3/	3/	83,294.00	2,952.00
1966	25,000.00	3/	3/	84,630.00	2,820.00
1967	28,700.00	15,000.00	43,700.00	100,450.00	4,245.00
1968	46,000.00	11,000.00+	57,000.00+	62,000.00	2,800.00
1969	71,000.00	3/	3/	3/	3/
1970	186,000.00	40,000.00	226,000.00	3/	5,520.00
1971	200,000.00	40,000.00	240,000.00	3/	5,970.00
1972	260,000.00	52,136.00	312,136.00	3/	3/
1973	925,000.00	274,200.00	1,199,935.00	3/	3/
1974 4/	1,822,784.00	345,000.00	2,167,784.00	3/	18,121.00
1975 5/	1,365,648.00	210,000.00	1,576,568.00	3/	16,955.00
1976	580,375.00	3/	3/	3/	15,364.00
1977	1,033,950.00	3/	3/	3/	19,960.00
1978	575,260.00	3/	3/	3/	9,913.00 6/
1979	990,263.00	3/	3/	3/	18,302.00 6/
1980	1,446,633.00	3/	3/	3/	11,820.00 6/
1981	3,246,793.00	3/	3/	3/	11,220.00 6/
1982	1,961,518.00	3/	3/	3/	7,085.00 6/

1/ Includes wages paid to tender boat operator, processing plant employees in district.
2/ Based on type of processing when fish were shipped out of the district.
3/ Information not available
4/ Includes $9,193 from the experimental commercial fishery at Deering
5/ Includes $17,776 from the experimental commercial fishery at Deering
6/ Includes permit and vessel license fees only.
7/ Some estimates between 1962 and 1981 include only chum value which, in figures, represent over 99% of the total value. Figures after 1981 represent the chum value as well as incidental species such as char, whitefish, and other salmon species.

Appendix Table 20. Comparative chum salmon aerial survey escapement estimates, Kotzebue district, 1962-1982.

	1962	1963	1964	1965	1966	1967	1968
Noatak River System							
Noatak River (below Kelly River)	168,000	1,970	89,798	4,177	101,640	28,620	39,394
Eli River	9,080	35	-	-	12	-	5,502
Kelly River & Lake	1,818	600	-	3,155	570	225	375
TOTAL	178,898	2,605	89,798	7,332	102,222	28,845	45,271
Kobuk River System							
Main Kobuk River							
Mouth to Kobuk	-	-	7,985	-	-	-	-
Kobuk to Pah River	-	-	-	1,000	266	_	530
Pah River to 'just below Selby River'	-	400	-	-	-	-	50
Selby River mouth and Slough	-	2,575	-	1,750	630	1,625	70
Selby River mouth to 'just below Beaver R.'	-	-	-	-	-	75	170
Beaver River mouth	-	1,095	-	-	460	795	1,550
Above Beaver River	-	465	-	-	118	-	-
Main Kobuk River TOTAL	23,150[2]	4,535	7,985	2,750	1,474	2,495	2,370
Squirrel River	16,050	2,200	8,009	7,230	1,350	3,332	6,746
Salmon River	12,936	1,535	9,353	1,500[1]	3,957	2,117	3,367
Tutuksuk River	10,841	670	2,685	-	1,383	169	823[1]
Kobuk R. System TOTAL	62,977[3]	8,940	28,032	11,480	8,164	8,113[3]	13,306

1/ Poor survey conditions or incomplete survey
2/ Probably represents over-estimate and includes some sheefish
3/ Counts have been revised and are now correct.

Appendix Table 20. Comparative chum salmon aerial survey escapement estimates, Kotzebue district, 1962-1982. (continued)

	1969	1970	1971	1972	1973	1974	1975
Noatak River System							
Noatak River (below Kelly River	33,395	138,145	41,064	64,315[1]	32,144	129,640	96,507
Eli River	68[1]	-	-	3,286	-	2,216	1,302
Kelly River & Lake	150	-	-	-	3,890	6,978	3,772
TOTAL	33,613	138,145	41,064	67,601[1]	36,934	138,834	101,581
Kobuk River System							
Main Kobuk River							
Mouth to Kobuk	-	-	-	-	1/	-	-
Kobuk to Pah River	-	1,753	4,953	-	1/	-	1,843
Pah River to just below Selby River	-	20	2,039	1,865	1/	4,710	3,940
Selby River mouth to Slough	-	4,820	3,100	7,400	1/	7,380	2,284
Selby River mouth to just below Beaver R.	-	2,385	4,720	3,170	920	13,775	2,291
Beaver River mouth	-	4,930	2,000	3,000	850	1,444	-
Above Beaver River	-	-	-	2,720	700	-	-
Main Kobuk River TOTAL	7,500[3]	13,908	17,202	18,155	2,470[1]	27,309	10,358
Squirrel River	6,714	4,418[1]	6,628	32,126[1]	12,345	32,523	32,256
Salmon River	2,561	3,000[1]	5,453	2,073[1]	6,891	29,190	8,221
Tutuksuk River	159	2,000[1]	1,384	-	-	5,265	1,344[1]
Kobuk River system TOTAL	16,934	23,326	30,667	52,354	21,706	94,287	52,179

1/ Poor survey conditions or incomplete survey or late survey
2/ Probably represents over-estimate and includes some sheefish
3/ Counts have been revised and are now correct

Appendix Table 20. Comparative chum salmon aerial survey escapement estimates, Kotzebue district, 1962-1982. (continued)

	1976	1977	1978	1979	1980	1981	1982
Noatak River System							
Noatak River (below Kelly River)	44,484	11,221	37,567	19,655	164,474	116,513 1/	20,682 1/
Eli River	1,205	742	5,230	1,323	11,891	-	389
Kelly River & Lake	217	290	158	3,200	7,416	13,770 3/	11,604
TOTAL	45,906	12,253 1/	42,955	24,178	183,781	130,283	32,675
Kobuk River System							
Main Kobuk River							
Mouth to Kobuk	-	-	-	-	-	-	-
Kobuk to Pah River	372	-	269	75	1,694	18	2,643 1/
Pah River to just below Selby River	1,432	-	1,448	183	2,063	309	583 1/
Selby River mouth to Slough	-	-	211	1,110	-		3,454
Selby River mouth to just below Beaver R.	-	-	53	640	6,925 2/	8,321 2/	5,268
Beaver River mouth	-	-	-	-	784		-
Above Beaver River	-	-	-	-	-		1,711
Main Kobuk River TOTAL	1,804 1/	-	1,981	2,008	11,466	8,648	14,674
Squirrel River	6,922	1,758 1/	1,863	1,500 1/	13,536	9,854	7,690
Salmon River	1,161	-	814	738 1/	8,456	4,709	1,240
Tutuksuk River	758	-	368	382 1/	1,165	1,114	1,322
Kobuk River system TOTAL	11,370	1,758	5,026	4,628	34,623	24,325	24,926

1/ Poor survey conditions or incomplete survey or late survey
2/ Probably represents over-estimate and includes some inconnu
3/ foot survey

Section 2
PACIFIC HERRING

Section 2: PACIFIC HERRING

Spawning Areas and Timing

The arrival of herring on the spawning grounds appears to be greatly influenced by climatalogical conditions, particularly the extent and distribution of the Bering Sea ice pack. Most herring spawning populations appear near the eastern Bering Sea coast immediately after ice break-up in mid-May and early June. Spawning progresses in a northerly direction and continues until July and August along portions of the Seward Peninsula and Chukchi Sea.

Spawning areas north of the Yukon River include: Stuart Island to Tolstoi Point and Cape Denbigh/Norton Bay in Norton Sound, Imuruk Basin in Port Clarence area, Shishmaref and the Deering-Kiwalik area in Kotzebue Sound. Very little information is available for stocks in the northern Seward Peninsula-Kotzebue Sound areas.

Fishing History

Pacific herring (Clupea harengus pallasi) have been utilized for subsistence purposes by coastal residents prior to the mid-1800's when their use was first documented by early explorers. The earliest American commercial effort on Bering Sea herring apparently took place in the early part of this century at Golovin Bay in Norton Sound.

Early records indicate that about 2800 metric tons of "fall herring" were processed in Norton Sound from 1916 to 1941. This fishery was dependant on salt curing and declined because of poor marketing conditions arising from foreign competition (Appendix Table 21). The Japanese began gillnetting in Norton Sound during 1968 with three vessels. Effort was concentrated about 12 miles offshore between St. Michael and Golovin. Approximately 40 Japanese vessels reported harvesting a record 1,240 metric tons of herring during 1969 (Appendix Table 22). The Japanese gillnet fishery was prohibited in 1977.

Domestic commercial effort resumed in Norton Sound in 1964 near Unalakleet and has continued on a sporadic basis until 1979. Between 1964 and 1978 the fishery averaged about 12 metric tons of herring annually and was based on "spring herring" for sac roe extraction (Appendix Table 23).

In 1979, a domestic herring fishery for sac roe began on a larger scale in Norton Sound. Approximately, 1,172 metric tons of herring was taken by 63 fishermen. During the 1979 season, purse seines were legal

gear and took 70% of the total catch. Thirteen of the 63 fishermen used purse seine gear and the other 50 fishermen used gillnets.

After the 1979 season, the Alaska Board of Fisheries adopted a public proposal which made gillnets and beach seines the only legal gear. A purse seine season could only be opened if the gill net fleet could not take the allowable harvest. This regulation was an attempt to encourage involvement of local fishermen in this new fishery. Local fishermen could only afford the investment in gillnet gear and the prohibition of purse seine gear would decrease competition with this highly efficient gear type. During the 1980 season 294 gillnet fishermen harvest 2224.6 metric tons of herring. (Appendix Table 23). Gillnet fishermen demonstrated that they were capable of taking the available harvest and in 1981 a regulation was passed which disallowed any purse seine season opening.

COMMERCIAL FISHERY

Sac Roe Fishery

The Norton Sound 1982 herring season opened by regulation on April 15, but the first commercial delivery was not made until June 3. The season was closed in subdistricts 1,2, and 3 by June 11 resulting in a harvest of 3,567 metric tons of herring (Table 14). Subdistricts 4-7 closed by regulation on July 31 with no reported deliveries. This was the second largest catch since the large scale domestic sac roe fishery began in 1979. Harvests from other years are presented in Appendix Table 23.

There were 237 fishermen who made at least one delivery. This was only 71% of last year's effort when 332 fishermen made deliveries. Of these, about 45% were residents of the Norton Sound area. The remaining 55% were fishermen who accompanied processors or tenders that came into Norton Sound from herring fisheries located in the south. Local fishermen landed approximately 25% of the total harvest.

There were seven companies present on the grounds to purchase herring. These companies were represented by 28 vessels which served as tenders or processing vessels.

The average roe recovery was 8.8% with prices ranging from $300 - 350 per ton for 10% roe recovery. Prices were adjusted up or down for each percentage point above or below 10%. The average price paid to the fishermen for a ton of 8.8% fish was $270. The value of the total herring harvest to the fishermen was approximately 1 million dollars,

about 2/3 the value of the 1981 record harvest.

Fishing effort initially began in the Unalakleet area (subdistrict 2) on June 3 and escalated despite low roe recoveries (Table 15). Approximately 257 m.t. of 7% herring sac roe was taken during the first three days of fishing. Effort and catches increased sharply and a closure was announced effective June 7 in order to assess the harvest. The harvest totaled 857 m.t.

Reliable biomass estimates in subdistrict 2 were impossible throughout the season due to turbid water. The 1981 peak biomass estimate in this subdistrict was approximately 4,000 m.t. with 3,300 m.t. remaining on the grounds after the fishery. Since the age class structure of the population indicated a stable biomass, the harvest level in subdistrict 2 was maintained at levels comparable to the 1981 harvest of 754 m.t. This subdistrict was not reopened after the initial closure with the final harvest remaining at 857 m.t. with an overall roe recovery of 8.1%. A total of 85 permit holders made deliveries in this subdistrict.

After the closure of the Unalakleet subdistrict, fishing effort moved south to the St. Michael subdistrict and concentrated near Black Point and Klikitarik Bay. Spawn was first observed near Black Point on June 5 with a peak biomass estimate of 6,796 m.t. observed on June 6. Fishing effort continued to increase markedly and an emergency closure was issued effective June 8 in order to assess the harvest. The harvest totaled 1,870 m.t. or 27.5% of the biomass observed at that time. Aerial surveys continued to be flown with an additional 1,386 m.t. of new fish sighted around Stuart Island on June 13 bringing the overall exploitation rate in subdistrict 1 to 22.9%. Subdistrict 1 remained closed after June 8 achieving an average roe recovery of 8.8% with 140 fishermen making deliveries.

With subdistricts 1 and 2 closed, fishing effort moved to Cape Denbigh (subdistrict 3) with initial deliveries being made on June 8. Fishing effort increased sharply and concentrated on both sides of Cape Denbigh. A closure was announced 6 A.M., June 10 in order to assess the harvest which reached 389 m.t. This represented only 8.3% exploitation of the 4845 m.t. observed biomass on June 9. Subdistrict 3 was reopened effective 3 P.M. June 10 for a 9 hour period in order to increase the stock exploitation rate to the 10-20% level. After the 9 hour opening the harvest totaled 840 m.t. taken by 74 fishermen with an average roe recovery of 9.5%. This subdistrict remained closed after June 10 with an exploitation rate of 17.3%. No reported commercial landings were made in subdistricts 4-7; however, several commercial fishermen test fished in the Golovin Bay area and reported insignificant catches of spawned out herring.

Spawn on Kelp Fishery

The majority of kelp (Fucus Sp.) in Norton Sound occurs in the St. Michael subdistrict. A harvest guideline of 30 m.t. of spawn on kelp is in effect for the major kelping grounds (Wood Point to Canal Light Point). The area around Stuart Island and the area between the Golsovia River and Wood Point are closed to commercial kelping by regulation.

The spawn on kelp fishery opened by regulation on April 15. A closure was announced for all waters effective June 10, prior to any harvest, in order to prevent further exploitation of the herring resource where an exploitation rate of 27% had already occurred. Department field crews stationed on the kelping grounds also reported that spawn deposition in the waters open to commercial kelping ranged from absent to light. The initial closure also prevented removal of large amounts of substrate which would have occurred if harvesting took place in areas of light spawn.

Additional spawn and fish were sighted on June 13 and 14. Department crews reported increased spawn deposition in waters open to commercial kelping with good spawn having already occurred in the closed area between Golsovia River and Wood Point. Also the documentation of additional herring biomass lowered the sac roe harvest exploitation rate to 23%. Due to these factors the spawn-on-kelp fishery was reopened for one low tide; 12 noon June 15 to 12 noon June 16. During this period approximately 44 fishermen and 30 helpers harvested 34.9 m.t. of spawn-on-kelp. The product was of good quality averaging 2-3 egg layers, with spawn accounting for approximately 80% of the total weight. Fishermen received an average of 75¢/pound with the entire fishery worth $57,585 to the fishermen. Virtually all the kelp harvested came from Fivemile Point to Leibes Cove (approximately 8-11 miles west of Wood Point).

Biomass Estimates

Herring biomass is determined through aerial survey observations. Surface areas of herring schools are calculated and then are multiplied by a tonnage conversion factor to arrive at the total biomass. The Relative Abundance Index (RAI) is the standardized unit of surface area measurement used and is based on 50m2. (Appendix Table 25). An inseason tonnage conversion factor of 3.1/RAI was used during the 1982 season. This surface area-biomass conversion factor was derived from past research studies conducted in the Togiak district where purse seiners were contracted to make sets on herring schools for which the surface area was known.

The Norton Sound herring biomass was estimated to be 15,797 m.t. in subdistricts 1,2, and 3 which supported the commercial herring harvest (Table 16). This was obtained by analysis of 31 aerial surveys flown during 21 days for a total of 75 hours of flight time (Table 17). This biomass estimate is to be considered conservative since visibility during surveys was often limited by turbid waters, wave action or cloud cover. Survey conditions were worse than those experienced during 1981. During both years, water visibility in the Unalakleet subdistrict was unsatisfactory to poor.

Inshore herring migration patterns differed from 1981 to 1982 although in both years sightings of a few herring schools initially occurred in the southern section of the Cape Denbigh subdistrict. During 1981 more than half the estimated biomass of 20,935 m.t. passed through inshore waters of Stuart Island. However, in 1982 the Stuart Island area was initially ice bound and the first major herring concentration appeared near Black Point and Klikitarik. Major concentrations of fish were not spotted around Stuart Island in 1982.

The biomass for the St. Michael subdistrict was estimated to be 8,182 m.t. in 1982. This was obtained by adding two observations: 1) June 6 survey of 6,796 m.t. subdistrict wide; and 2) June 13 survey of 1,386 m.t. that had just moved inshore near Stuart Island. Biomass estimates (June 14) of 1,063 m.t. and 4,855 m.t. for the Unalakleet and Cape Denbigh subdistricts, respectively, were added to the current harvest (1,697 m.t.) for both subdistricts resulting in a biomass estimate of 7,615 m.t. This biomass estimate appears to be representative for both subdistricts as pre, post, and actively spawning herring were observed on the survey.

Seven aerial surveys were extended into subdistricts 4-7 of northern Norton Sound. Fish schools were observed in all northern subdistricts; 167 m.t. in Norton Bay, 1,655 m.t. in Elim, 316 m.t. in Golovin and 530 m.t. in Nome. Observed tonnages in the Nome subdistrict probably reflect the presence of both capelin and herring. Surveys of these subdistrict coastal waters were not conducted frequently enough to estimate total biomass.

A total of 88 herring spawns were observed throughout the district for a total of 23.1 miles of spawn. The first spawn was observed near Black Point in the St. Michael subdistrict on June 5 and thereafter in the Tolstoi Point to Stuart Island area with the last spawn seen on June 13. Spawning was first observed in the Cape Denbigh subdistrict on June 9 near Pt. Dexter with the last spawn (4 miles in length) observed in this subdistrict on June 14 on the east side of the cape. Also on June 14 four spawns were observed in the Elim subdistrict near Walla Walla Creek.

Prior to the herring season a purse seine charter was arranged for Norton Sound to establish herring surface area conversions to metric ton equivalents. Since sea ice breakup was later than anticipated, the contract was cancelled. Hopefully a charter will be established to conduct this research during the 1983 season.

Other Research

Herring research field camps were established and operational at Klikitarik (May 31-June 25), Unalakleet (May 22-June 9) and Cape Denbigh (June 13-27). Field personnel were involved in collection of herring age, length, weight and relative gonad maturity composition through variable mesh gillnet and commercial catch sampling. Other activities included spawn deposition and substrate surveys, monitoring kelp harvest and climatological conditions, informing fishermen of fishery announcements and research findings and patrolling the commercial fishery.

Observed spawn initiated June 5 near Black Point and terminated in the Cape Denbigh area June 14 at temperatures ranging between 1.5°C and 8°C. In southern Norton Sound it took approximately 13 days for the eggs to eye and another 2-3 days to hatch at a water temperature of approximately 14°C. Spawn was widespread in the St. Michael subdistrict and ranged from 2-8 egg layers depending on location. Spawn took place intertidally on Fucus and rock substrate. It is suspected subtidal spawn also occurs on stringy red algae (Rhodomala Larix) ; however, the extent and location of subtidal spawn and spawn substrate is unknown.

The spawn at Cape Denbigh of 2-6 egg layers took place primarily on rock substrate with some deposited on thinly scattered Fucus. Bottom drags were made near Beeson Slough and Point Dexter to locate subtidal spawn substrate, however, none was obtained. Eel grass with attached spawn was dragged from near Point Dexter during 1981 studies.

Although it is suspected that spawning occurs near Blueberry Creek in the Unalakleet subdistrict no spawn or spawn vegetative substrate has been documented. It is known that herring in this area will spawn on salmon gillnets. Saffron cod and birds inflicted substantial spawn predation. Also hot, dry weather created extensive egg mortality during the eyed egg stage due to desication particularly in the upper intertidal areas.

Variable mesh gillnet age class composition of 1,536 samples revealed the following age composition: age 3, 7%; age 4, 23%; age 5, 56%; age 6, 8%, age 7 1%, age 8, 4%, and age 9,1% (Appendix Table 24). The male to

female sex ratio was 1.2 to 1.0. The Cape Denbigh crew reported a strong showing of ripe age three herring during their last few days of test fishing (6/24-6/30) indicating spawn was yet to occur in that area. Age class composition of the commercial catch appears to be very similar to that of the variable mesh test catch. Analysis of 637 commercial samples indicated 23% age 4, 63% age 5, 10% age 6 and 4% ages 7-9 plus, with a male to female sex ratio of 1.4 to 1.0.

Outlook for 1983

Aerial surveys conducted during the 1982 season documented a biomass of approximately 16,000 m.t. These estimates were not done under good survey conditions and therefore should be considered minimum. The 1982 biomass represents a 25% decrease from the 1981 record biomass of 21,000 m.t. During the 1982 season a harvest of 3,567 m.t. lowered the biomass left after the fishery to approximately 12,500 m.t.

Looking at the age class structure of the population, some qualitative assumptions can be made about expected biomass changes. Natural mortality does not appear to start severely reducing an age class until after age 6 is attained. Therefore in 1983 the majority of 5 and 6 year old fish, which comprised almost 80% of the 1982 population, should remain in the fishery. Natural mortality should significantly reduce the 7,8, and 9 year old classes (which made up 13% of the 1982 population) in 1983. Some recruitment can be expected in the 4 year old age class; however, this is not expected to be large since the 1982 population was made up of only 7% 3 year olds.

Considering the overall age class structure of the 1983 population, no major changes are expected in the 12,500 m.t. biomass which remained after the 1982 fishery, which is 43% and 22% below the 1981 and 1982 levels, respectively. Since the biomass is expected to decline for the second year in a row and strong recruitment is not expected, a 20% exploitation level may no longer be warranted. For the purposes of in-season management, more conservative 15% exploitation rate will be applied unless strong recruitment or increased biomass appears. The best preseason estimate of the 1983 harvest would be 15% of a 12,500 m.t. biomass or 1875 m.t.

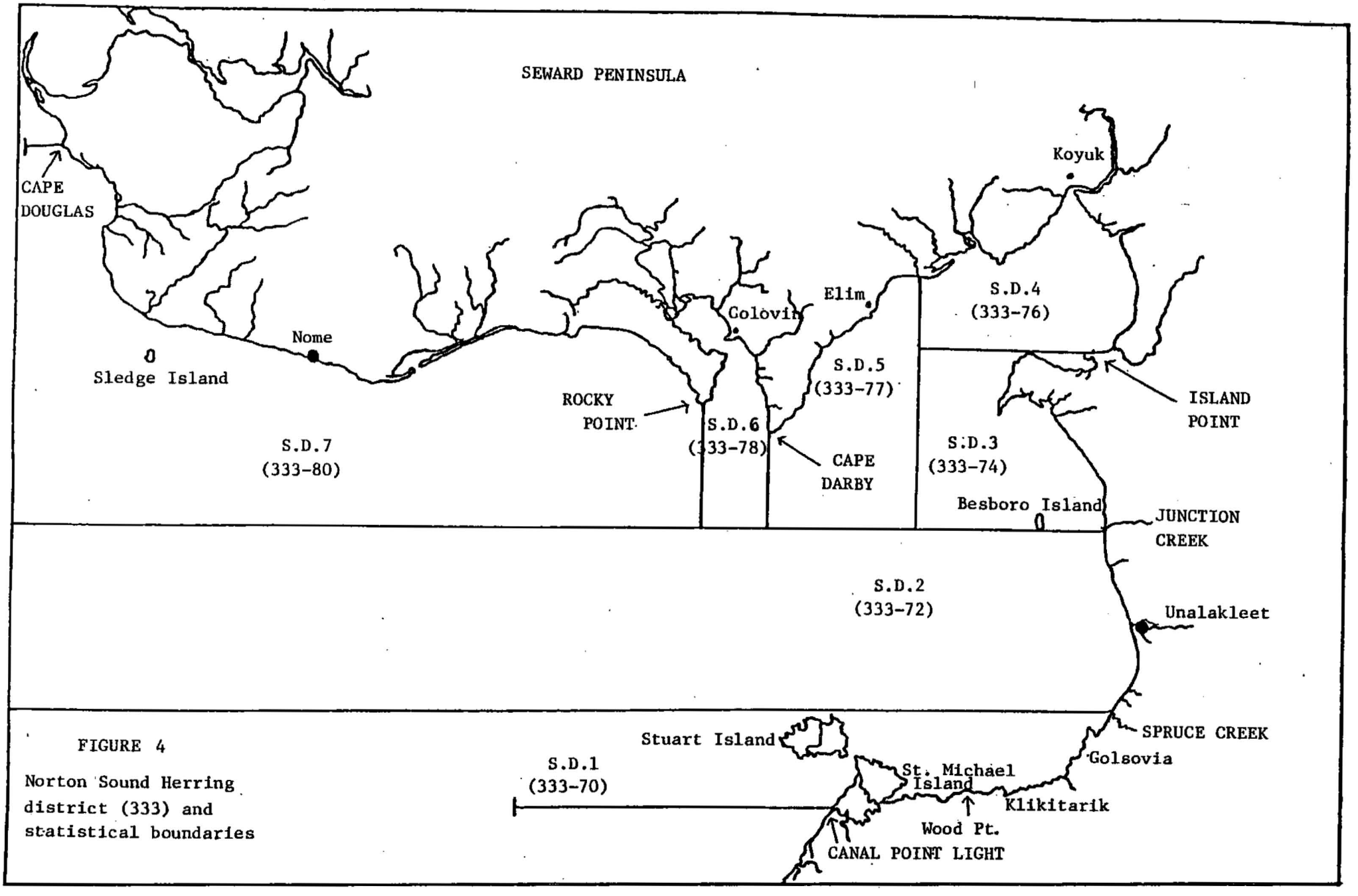


FIGURE 4

Norton Sound Herring district (333) and statistical boundaries

Table 14. Norton Sound District Herring Harvest by Subdistrict, 1982.

Stat Area	Boundaries	Herring Gillnet (mt)	x̄ Roe Recovery	Number Fishermen
333-70	Canal Point Light to Spruce Creek	1870.0	8.8%	140
333-72	Spruce Creek to Junction Creek	858.0	8.1%	85
333-74	Junction Creek to Island Point [1/]	839.0	9.5%	74
District Totals		3567.0	8.8%	237 [2/]

1/ Reported Harvest (Does not include an estimated 80 m.t. that was dumped).

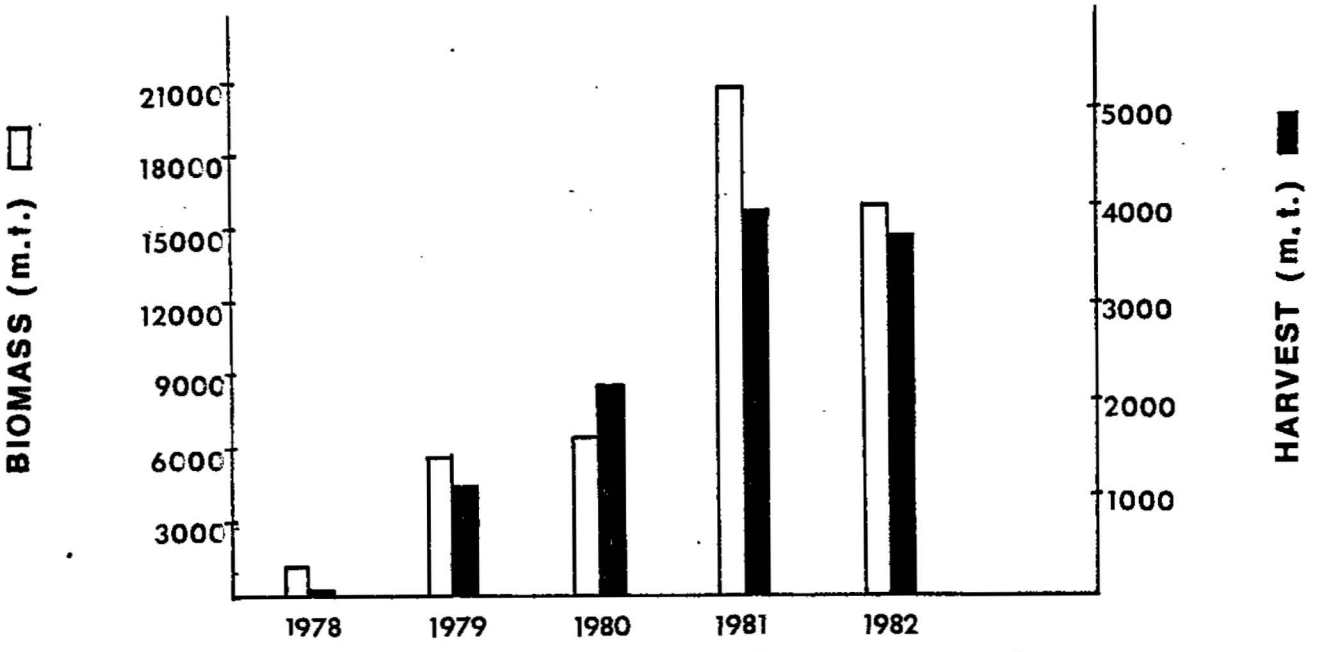
2/ Some fishermen fished more than one subdistrict.

Table 15. Norton Sound Herring Harvest by Subdistrict and Date, 1982.

Date	333-70 Canal Point Light-Spruce Creek				333-72 Spruce Creek-Junction Creek				333-74 Junction Creek-Island Point				District Totals			
	Daily m.t.	Cum.	Daily $\bar{x}$ Roe [1/]	Daily Fisher men	Daily m.t.	Cum	Daily $\bar{x}$ roe	Daily Fisher men	Daily m.t.	Cum	Daily $\bar{x}$ roe	Daily Fisher men	Daily m.t.	Cum.	Daily $\bar{x}$ roe	Daily Fisher men
6/3					7	7	8.0%	4					7	7	8.0%	4
6/4					63	70	6.4%	23					63	70	6.4%	23
6/5					187	257	7.3%	33					187	257	7.3%	33
6/6	119	119	7.9%	24	251	508	9.0%	45					370	627	8.0%	69
6/7	654	773	8.5%	87	337	845	8.0%	71					991	1618	8.3%	158
6/8	1097	1870	9.1%	101	12	857	8.9%	6	81	81	8.6%	6	1190	2808	9.1%	112
6/9									34	115	8.6%	5	34	2842	8.6%	5
6/10									559	674	9.8%	85	559	3401	9.8%	85
6/11									166	840	9.2%	28	166	3567	9.2%	28
TOTALS	1870 [2/]		8.8%	140		857 [3/]	8.1%	85		840 [4/]	9.5%	74		3567	8.8%	237

1/ Daily roe % includes sac roe average only; does not include bait.
2/ Includes a harvest of approximately 24 m.t. for bait.
3/ Includes a harvest of approximately 35 m.t. for bait.
4/ Includes a harvest of approximately 3 m.t. for bait.

Table16. Biomass estimates (m.t.) for Norton Sound Herring fishing grounds (subdistricts 1,2,3). Harvest data includes entire Norton Sound District (subdistricts 1-7).



	Biomass[1/] (m.t)	Harvest[2/] (m.t)	% Exploitation	% Roe	Dollar Value (Millions)	# Fishermen
1978	1,156	14	1	-	-	11
1979	5,478	1,173	21	7.0	0.6	67
1980[3/]	6,151	2,225	36	8.1	0.5	294
1981	20,935	3,965	19	8.8	1.5	332
1982[3/]	15,797	3,567	23	8.8	1.0	237

1/ Biomass was calculated by using peak aerial survey counts. Adjustments were made to account for the arrival of new fish on non-peak days and to ensure fish were not counted twice. Harvest prior to peak surveys was added to the peak counts. A conversion factor of 3.1 m.t./50 m^2 was used for all years since this is the most current data available and makes all years comparable.

2/ Includes both bait and sac roe harvests. Over 99% of harvest comes from subdistricts 1,2, and 3.

3/ Minimal estimates due to poor survey conditions.

Table 17. Daily aerial survey herring biomass estimates and survey ratings, Norton Sound, 1982. [1/] [2/] [3/]

Date	SUBDISTRICTS (1) St. Michaels Rating	mt	(2) Unalakleet Rating	mt	(3) Cape Denbigh Rating	mt	(4) Norton Bay [4/] Rating	mt	(5) Elim [4/] Rating	mt	(6) Golovin [4/] Rating	mt	(7) Nome [4/] Rating	mt
5/17	P	-	P	0	P	0	P	0	P	0	P	0	P	0
19	P	0	P	0	F	294	-	-	-	-	-	-	-	-
25	U	0	U	0	U	0	-	-	-	-	-	-	-	-
31	F	0	F	91	P	105	U	0	-	-	-	-	-	-
6/2	G-U	56	U	0	-	-	-	-	-	-	-	-	-	-
3	G	502	G-P	1130	U	31	-	-	-	-	-	-	-	-
5	F	2179	P	0	-	-	-	-	-	-	-	-	-	-
6	F	6796 [5/]	F-U	0	U	0	-	-	-	-	-	-	-	-
7	P	1550	P	0	-	-	-	-	-	-	-	-	-	-
8	F	1757	U	260	P	3772	-	-	-	-	-	-	-	-
9	U	158	U	0	G	4845	-	-	-	-	-	-	-	-
10	P	0	P	9	G	852	-	-	-	-	-	-	-	-
11	P	95	P	10	G	5685	U	0	F	15	G	0	G	530
12	U	2942	P	0	F	2061	U	0	U	0	U	0	G	269
13	G-U	1687 [5/] [6/]	U	0	-	-	-	-	-	-	-	-	-	-
14	-	-	G-U	1063 [5/]	G	4855 [5/]	F-P	167	G	1655	U	251	-	-
16	P-U	180	U	0	U	0	U	0	F	46	F-G	0	-	-
18	F-P	3599	P	0	F-P	5357	P	0	E	62	F-G	316	P	43
22	-	-	P	0	P	53	U	0	F	0	G	0	-	-
23	P-F	229	P	0	-	-	-	-	-	-	-	-	-	-
26	-	-	F	0	F	0	G	22	G	341	-	-	F	31

1/ Based on assumption that each observed 50 sq. meters of herring surface area is equivalent to 3.1 metric tons.
2/ Survey ratings: E-Excellent, G-Good, F-Fair, P-Poor, U-Unsatisfactory
3/ In calculating biomass the commercial harvest prior to peak survey were added for subdistricts 2 & 3.
4/ Capelin known to inhabit area and may be included in counts.
5/ Peak survey day used in calculating peak biomass for subdistricts 1-3. No biomass estimate was made for subdistricts 4-7 due to the inconsistency of surveys, and lack of herring and capelin timing information.
6/ Only 1386 mt were identified as new fish entering the District.

Appendix Table 21. Northern Bering Sea fall herring production, 1916–1941.

Year	Location	Number of Processors	Scotch Cured Barrels	Scotch Cured Half Barrels	Hard Salted Barrels	Remarks
1916	Golovin	4	559*			*Norwegian pack as opposed to Scotch style.
	Teller	1	9*			
1917 1/	Golovin	5	1,275*			1/ Introduction of Scotch method of curing by U.S. Bureau of Fisheries.
	Teller	1	300*			
1918	Golovin	11	5,169* 2/			
	Council	1	167*			
1919	Golovin	6	2,555* 3/			2/ Includes 500 bbls. of Scotch style.
1920	Golovin	4	331			
1921	Golovin	1	562			3/ Includes 900 bbls. of Scotch style.
	St. Michael	1	60			
1922	Golovin	2	500			
1923	Golovin	1	352			
1924	Golovin	1	750			
1925	Golovin	1	200			
1926	Golovin	1	620			
1927	Golovin	1	490	100		
1928	Golovin	1	850 4/	370		4/ Includes 435 bbls. of bloater stock.
1929	Golovin	1	200* 5/	887*		
1930	Golovin	3	1,637 6/	1,614		5/ Plus an additional 432 half tierces of bloater stock.
1931	Golovin	2	219 7/	180		
1932	Golovin	3	3,533 8/	905		6/ Includes 26 tierces and 500 half tierces; plus an additional 62 tierces of roused herring.
1933	Golovin	2	8 9/	75		
1934	Golovin	1		42	100	
1935	Golovin	1		57	96	7/ Plus an additional 238 half tiercse of bloated stock.
1936	No commercial operations reported					
1937						8/ Plus an additional 31 tons of bloater stock.
1938	Golovin	1		35	62	
1939	Golovin	1		27	30	9/ Plus an additional 25 tons of bloater stock.
1940	Golovin	1	16	22	85	
1941	Golovin	1			30	

Summary: 10/

3,201,625 lbs.	Scotch cured (52.0%)
2,319,375 lbs.	Norwegian cured (37.7%)
488,750 lbs.	Bloater stock (7.9%)
100,750 lbs.	Hard salted (1.6%)
49,600 lbs.	Roused herring (0.8%)
6,160,100 lbs.	All products (1916-1941)

10/ One full barrel contains 250 pounds of herring. Three size grades were packed: large herring (No. 1) measuring 30-33 cm total length were packed 450 to a barrel; No. 2 herring went 550 to a barrel; No. 3 herring went 650-700 to a barrel (Wigutoff and Carlson, 1950). One tierce equals 800 pounds (Pacific Fisherman, 1931). A total of 98.6% of the total production from 1916-1941 was processed in Golovin.

Appendix Table 22. Japanese gillnet herring catches in Norton Sound, 1968-1977. (North of 63° N. Latitude and east of 167°W. Longitude)

Year	Gillnet Catch (MT)	Remarks
1968	119	First foreign effort on herring in Norton Sound.
1969	1,270	Peak catch with large effort (about 40 ships). Two vessels apprehended.
1970	63	
1971	638	
1972	14	
1973	35	
1974	693	
1975	0	
1976	-	Data unavailable at time of writing this report.
1977	-	Herring fishery closed to foreign nations.
TOTAL	2,832	Exludes 1976 catches.

Appendix Table 23 . Norton Sound Commercial Herring Harvest, 1964-1982.

Year [1]	Herring Metric Tons	Percent Roe Recovery	Remarks
1964	18.1	6.3	Roe product poor due to poor handling methods.
1965	NO DOMESTIC HARVEST		
1966	10.8	-	
1967-68	NO DOMESTIC HARVEST		First foreign effort on herring occurred in Norton Sound in 1968.
1969	1.8	8.7	Heavy foreign effort. Two Japanese vessels apprehended near St. Michael.
1970	7.3	8.4	
1971	17.7	8.2	
1972	15.3 [2]	25.9 [3]	
1973	32.3	3.0	
1974	2.4	0	Roe loss due to herring spoilage in the round and poor quality of roe.
1975	NO DOMESTIC HARVEST		
1976	7.7	?	
1977	9.5	6.5	Herring fishing closed to all foreign nations by Secretary of Commerce.
1978	13.6	?	
1979	1172.0	7.0	First year of serious domestic fishery-purse seines & gillnets.
1980	2224.6	8.1	Purse seines prohibited: 99% harvested by gillnets.
1981	3964.5	8.8	
1982	3567.0	8.8	

1/ Approximately 2800 m.t. of fall herring were commercially processed in Norton Sound from 1916-1941.
2/ Approximately .6 m.t. of this amount was taken in Nome.
3/ The value of this figure suggests that female herring only may have been reported.

Appendix Table24.Herring Age Composition in Test Fishing and Commercial Catches, Norton Sound, 1978-1982. (% of age class making up total catch)

Variable Mesh Gillnet Catch

Age of Fish in Years	2	3	4	5	6	7	8	9
1978	1	8	37	7	40	2	2	3
1979	+	18	6	57	5	9	1	4
1980	+	49	20	3	22	2	4	1
1981	-	6	75	10	1	6	1	1
1982	-	7	23	56	8	1	4	1

Commercial Catch

Age of Fish in Years	2	3	4	5	6	7	8	9
1978 1/	-	-	7	19	62	5	5	2
1979 2/	+	29	5	53	4	9	+	+
1980 3/	+	1	22	7	59	3	8	1
1981	-	1	59	24	2	11	1	2
1982 4/	-	-	23	63	10	1	2	1

1/ 13 m.t. harvest; only 74 samples
2/ Purse seines made up 70% of total harvest
3/ Gillnets made up 99% of total harvest
4/ Gillnets made up 100% of total harvest

Appendix Table 25 . Peak Relative Abundance Indices (R.A.I.) of herring in Norton Sound, based on peak aerial survey count. (Numbers represent counts of schools standardized by surface area $50m^2$), 1978-1982 1/

Index Area	Subdistricts	1978	1979	1980	1981	1982
St. Michaels	1	129	797	1033	3223	2192
Unalakleet	2	84	92	304	3197	365
Cape Denbigh	3	160	627	507	938	1728
Norton Bay	4,5	265	62	288	899	588
Golovin	6	59	34	43	419	102
Bluff	7	580	248 2/	67	524	171

1/ Biomass cannot be computed by totaling these counts. Adjustment must be made for harvest prior to peak counts, schools which have been counted in more than one index area, and the arrival of new fish after peak counts. See appendix table for biomass estimates.

2/ probably capelin

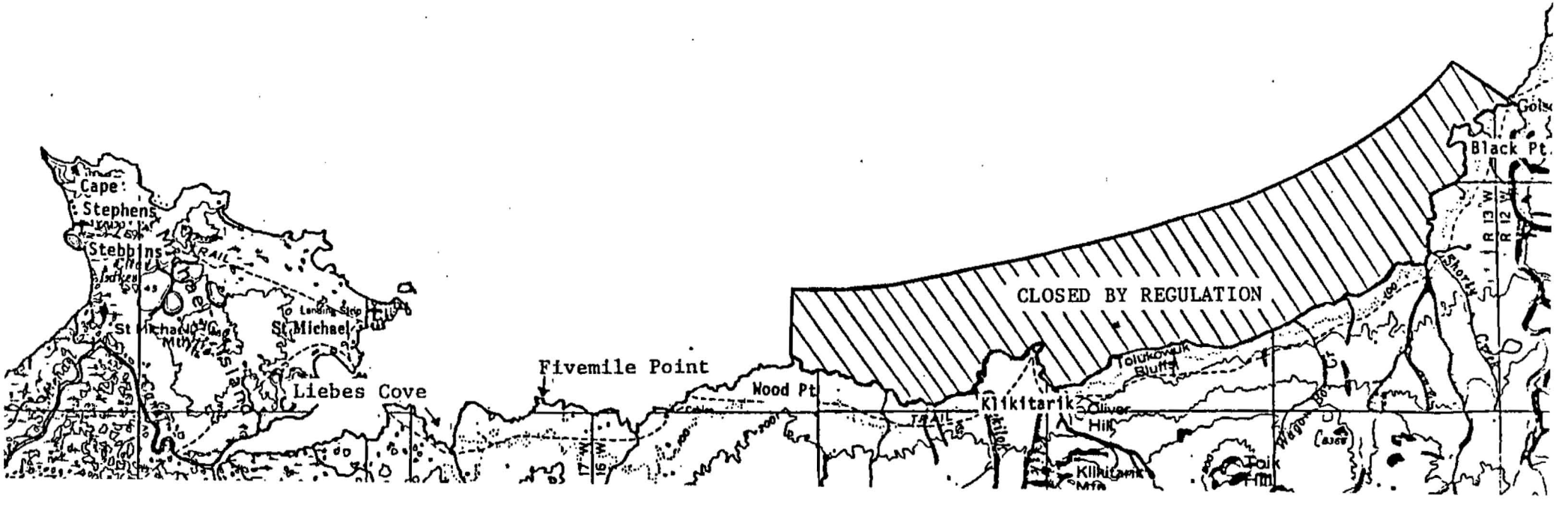
Appendix Table26. Norton Sound Commercial Herring by Subdistrict by year (m.t.), 1978-1982.

Index Area	1978	1979	1980	1981	1982
St. Michaels	-	289.4	1066.4	2782.5	1870.0
Unalakleet	13.6	367.2	573.6	754.2	858.0
Cape Denbigh	-	503.8	573.6	427.8	839.0
Norton Bay	-	-	4.6	.6	-
Golovin	-	-	6.4	-	-
Bluff/Nome	-	12.6	-	-	-
Norton Sound District Totals	13.6	1173.0	2224.6	3965.1	3567.0

Appendix Table 27. Norton Sound Commercial Spawn on Kelp Harvest, 1978-1982.

Year	m.t.	Fishermen
1978	4	9
1979	12	19
1980	22	20
1981	42	22
1982 *	35	44

*1982 harvest came from Fivemile Point.



Section 3
SHELLFISH

Section 3: Shellfish

Introduction

The Norton Sound section in the shellfish regulations is described as all waters east of 168 degrees W. long., between the latitudes of Cape Romanzof and Cape Prince of Wales. (Figure 5). The only shellfish fishery in Norton Sound is for red king crab (Paralithodes camtschatica). Blue king crab (P.platypus) and tanner crab (Chionoecetes opellio) also occur within the section but are very seldom caught by commercial or subsistence fishermen. Red king crab have been utilized for subsistence and recreational purposes by local residents for many years but the commercial fishery was not initiated until six years ago. In April 1977, the Alaska Board of Fisheries opened an "exploratory" commercial fishery in order to increase the knowledge of and commercially utilize Norton Sound king crab. Since 1976 there has been three National Marine Fisheries Service (NMFS) research trawl studies in Norton Sound as well as three Alaska Department of Fish and Game (ADF&G) research pot fishing studies. Data from these studies, information obtained from six tagging studies, and data from six commercial fishing seasons, has greatly increased the Norton Sound king crab data base.

Commercial Fishery Summary

There are two seasons in which crab may be taken commercially; January 1-April 30 and August 1-September 3. During the winter season crab are taken through-the-ice-near Nome. In 1982 poor ice conditions, similar to those experienced during the past three winters, severely hampered winter fishing operations. Due to poor ice conditions, fishermen were confined to an area within two miles of shore. Fishing was poor in these inshore waters and, although several people had commercial licenses, only one fisherman reported landings totaling 17 crab. (Appendix table 31).

Several new regulations were in effect for the 1982 summer fishery. Season dates were changed from July 15-September 3 to August 1-September 3. This was adopted because the later opening would improve the recovery rates of crab meat and allow processors to fully participate in earlier fisheries, namely salmon. The near shore closed area, which approximates an area 15 miles from the coast of southern Seward Peninsula (Figure 6). was retained but with the provision that the department could reduce this area by small increments, to no less than three miles from mean lower tide to allow the commercial king crab fishery to efficiently obtain the allowable harvest of red king crab if necessary. This regulation was modified in an attempt to continue protection of the near

shore winter king crab subsistence fishery, but still allow a commercial fishery to exist if a large percentage of the crab population was found in the closed area or the optimum yield (OY) could not efficiently be taken by fishing only in the open area. Finally, the 40% OY rate was lowered to 20% in light of a declining population and in an effort to minimize the impact on the winter subsistence fishery.

A preseason population estimate of 2.8 million pounds was developed from the results of the 1981 fishery and research efforts. The 1982 pot survey conducted by the department from July 5 through July 20 determined this estimate to be fairly accurate. A news release was distributed prior to the 1982 season informing fishermen and processors that a harvest of .5 million pounds was expected, based on the current population estimate and a 20% OY. The news release further stated that crab were widely distributed, occupying an area roughly 4,000 square miles, and fishermen might have difficulty harvesting the OY. Fishermen were also told to expect lower catches per pot than in the past.

Initial fishing effort began on August 9 and consisted of two vessels. On August 22 nine additional vessels arrived from the St. Matthews blue king crab fishery which closed August 16. By August 25 only 125,000 pounds had been harvested and the 11 vessel fleet was landing approximately 10,000 pounds per day. At this rate it was projected that the OY of 20% of the legal male crab population would not occur before the season closed on September 3. In an attempt to comply with the intent of the new regulations and to achieve the OY, approximately one third of the closed water section was opened to commercial crab fishing, on August 26. The closed area line, which approximates 15 miles from the coast of the southern Seward Peninsula, (Figure 6)was moved five miles towards shore between the longitude of Port Clarence and Golovin Bay. Fishing continued but catches remained low and by August 28 vessels began leaving to prepare for the later Pribilof season. By September 1 all fishing had stopped in Norton Sound.

The total 1982 harvest was 228,921 pounds which included 26,374 pounds dead loss. (Table 18). Frequent deliveries helped minimize dead loss caused by fresh water; however, the swelling of crab due to fresh water was more of a problem this year than the last several years. A total of ten fishing vessels and a catcher/processor vessel participated in the fishery. These vessels lifted approximately 11,230 pots for an average catch per pot of 6 legal male crab. The average weight per crab was 3.6 pounds. In addition to the fishing vessels, three processing

vessels were present to buy crab from the fishermen. The average price per pound was two dollars with the entire fishery worth about $400,000 to the fishermen. Nine of the eleven boats made less than $30,000 for their efforts which averaged nine days of fishing. The 1982 crab harvest and average catch per pot were the lowest on record. Appendix table 29 gives more historical data on the fishery.

After the 1982 fishery another estimate of the legal male crab population was made using tagged crab recovered in the fishery. An estimate of 1.3 million pounds of legal crab prior to the start of the fishery was derived. This estimate was lower than the preseason estimate of 2.8 million pounds. If the post season estimate is used the 1982 commercial harvest represents an 18% exploitation of the legal male population.

Subsistence Fishery

Red king crab are utilized by Norton Sound residents mainly during the winter. Fishing occurs through holes or cracks in the ice with the use of handlines and pots.

In order to document trends in the subsistence harvest, the Board of Fisheries enacted a regulation in 1977 requiring subsistence fishermen in Norton Sound to obtain a permit prior to fishing and record daily effort and catches on these permits. Catches are presented in Appendix Table31. After the first commercial harvest of about one half million pounds in 1977 a successful winter fishery was conducted during the winter of 1977-78 when the average subsistence fisherman took 70 crab and the average winter commercial fishermen took 260 legal sized crab. The winter fishery declined sharply the following year and has remained at very depressed levels through the 1981-82 season.

The lack of success in the winter crab fishery during the past few years has been attributed to a declining crab population caused by removal of crab in the summer commercial fishery together with low recruitment, low effort due to poor ice conditions, and changes in the near shore distribution of crab during the winter. All of these factors have probably had some affect on the success of the winter fishery in varying degrees. During the 1978-79 winter fishery, the king crab population was still relatively high (6 million pounds of legal sized male crab). Despite this relatively large population, winter catches were the worst on record indicating that the major factors limiting winter catches during 1978-79 were probably poor ice conditions and the offshore distribution of crab. During the winter of 1981-82, poor winter catches could more reasonably be attributed to a declining crab population and

commercial catch removals since the crab population was at its lowest documented level during this period.

During the winter of 1981-82 more effort occurred than the past 3 seasons. (Appendix table 31). Ice conditions and catches were relatively good in early February. Department personnel interviewed 3 groups of fishermen who had taken 33 crab with pots and handlines on February 11. Word of this success circulated around town and by February 13 about 30 different groups of fishermen were observed on the ice. Unfortunately on February 14 the ice pack broke off about 100 yards from shore and drifted away. It was roughly two weeks before the ice reformed and fishing could continue. When fishing resumed in early March, the success rate was not as high as it was in early February and effort levels dropped off.

Over the past four years the winter subsistence crab fishery has changed significantly. During the winter of 1977-78 and earlier seasons, the high abundance of crab made handlining an efficient gear type. The relatively low abundance of crab in near shore waters during recent winters have made handlines inefficient. The most successful fishermen are currently using king crab pots or traps. Also during years of high crab abundance the catch is probably more evenly distributed among the fishermen. Average catch per fishermen data can be very misleading during recent years. For example, two fishermen during 1980-81 took 60% of the harvest and in 1981-82 four fishermen took over 54% of the harvest.

These successful fishermen use pots and generally fished continuously for a month or two. When catches from these few successful fishermen are added together with less successful fishermen the resulting average is 16 crab per fishermen during the 1981-82 season. A more meaningful statistic for evaluating fishing success is the median catch. The median catch was 5 crab in 1980-81 and 7 crab in 1981-82. The median more realistically shows the amount of crab the majority of people caught.

Stock Status/Research

From July 5 to July 20 ADF&G conducted a pot survey in the Norton Sound Section for the third consecutive year. A total of 689 pots was lifted during the 16 fishing days, covering an area of roughly 4,000 square miles. A total of 7,020 male and 424 female king crab was captured(Appendix table 30). Twenty nine per cent (2,002) of the male crab were legal size; the majority were undersized males that will enter the

fishery as legal males in 1983 and 1984. (Figure 8). A total of 337 legal males was tagged and liberated along with 98 undersized males to obtain data on migration, growth, and for calculation of a population estimate using the mark and recapture technique.

Immediately after the 1982 commercial crab fishery, NMFS personnel on board the vessel Miller Freeman conducted a trawl survey in Norton Sound from September 5-11. A total of 50 tows was completed capturing 107 legal male, 322 sublegal male, and 265 female king crab (Appendix table 30). Of the males captured, 42% were either in the process of molting or had soft shells indicating that they had recently molted. The 1979 trawl survey also verified that male crab molt in September because in early August several soft shell and molting males were captured with the rest of the samples classified as old shell.

The results of both the 1982 NMFS and ADF&G research effort were similar in many ways. Both surveys showed an increase in the abundance of sublegal crab (Figures 8 and 9).The increase in abundance in sublegal crab indicates an increase in future recruitment, which has been very low over the past several years. These studies also showed that females had healthy egg clutches. Over 90% of the adult females examined had full egg clutches. The 1976 NMFS trawl survey, which occurred on a virgin population, identified 70mm as the length where more than 50% of the females would be egg bearing and 75mm and greater the length where 97% of the females would be egg bearing. The 1982 trawl data on female crab did not differ from the initial 1976 trawl. Eggs collected during the trawl survey were examined and found to be undergoing normal development.

The ADF&G survey for the third consecutive year documented a decrease in the abundance of legal male crab (Figure 8 , Appendix table 30). The number of legal male crab captured per pot has dropped from 8 to 5 to 3 during 1980, 1981 and 1982 respectively. The 1982 NMFS trawl survey shows a slight increase in the number of legal male crab from 1979 to 1982. In this regard the ADF&G and NMFS surveys are not comparable in that the NMFS survey occurred later in the year while molting was in progress. Because molting was in progress, recruitment was already occurring and therefore the size structure of the population had changed since the ADF&G survey. Had both surveys occurred before recruitment had began, results probably would have shown a decrease in the abundance of legal crab when compared to past surveys.

The Norton Sound king crab population in 1976 was largely comprised of recruit and pre-recruit crab. The abundance of legal male crab reached its peak in 1978 when it is estimated that there were 11 million pounds of legal crab. From 1979 to 1982 the population has had very low recruitment. As a result of fishing and natural mortality the abundance of legal crab dropped to 1.3 million pounds in 1982, using the 1982 post season ADF&G mark and recapture estimates. The increased abundance of sublegal crab in both the NMFS and ADF&G research surveys indicate that recruitment will increase during 1983 and 1984. Both agencies are expecting recruitment to increase the abundance of legal crab in 1983. This is further discussed under the following section on outlook.

In addition to these research efforts, ADF&G personnel sampled crab on board floating processors during the 1982 summer fishery. Over 1,000 crab were measured from the commercial catch. From these samples it was calculated that 25% of the 1982 harvest was made up of recruit crab.

ADF&G personnel fished crab pots from February-May 1982 in order to determine the abundance of king crab in waters close to Nome. Crab were tagged in order to study migration and growth. Shell age and female egg development were also noted in an attempt to document when molting and mating occurs. A total of 60 pots was pulled, capturing 246 male and 10 female king crab. Of the 246 male crab, 199 were tagged and released. The average length for male crab captured was 96 mm, with the average female measuring 77 mm in carapace length. Females with eyed and uneyed eggs were observed in each month of the study. Eyed eggs were fully developed and ready to hatch and, in fact, did hatch when brought into the office and allowed to reach room temperature. This data indicates that female crab are molting and mating at least during February-May. Further results of this study can be found in a separate report entitled Nearshore Winter King Crab Study Norton Sound (February-May 1982) ADF&G unpublished.

Outlook for 1983

Using the Peterson mark and recapture method, 1.6 million pounds of legal male red king crab are expected in Norton Sound prior to the 1983 summer fishery. If this estimate is accurate, the 1983 population will be slightly larger than the 1982 population estimate of 1.3 million pounds, as determined post season using tagged crab recoveries. This estimate predicts a population where recruit crab account for 55% of the weight and 70% of the individuals.

Using the trawl swept method, a population estimate of 2.6 million pounds of legal male crab has been derived.(Appendix table 30). This method estimated the population during early September 1982. It does not take into account any additional recruitment after the trawl was completed or natural mortality that may occur prior to the 1983 summer fishery. According to this method, 78% of the legal crab population in September 1982 was made up of recruit crab.

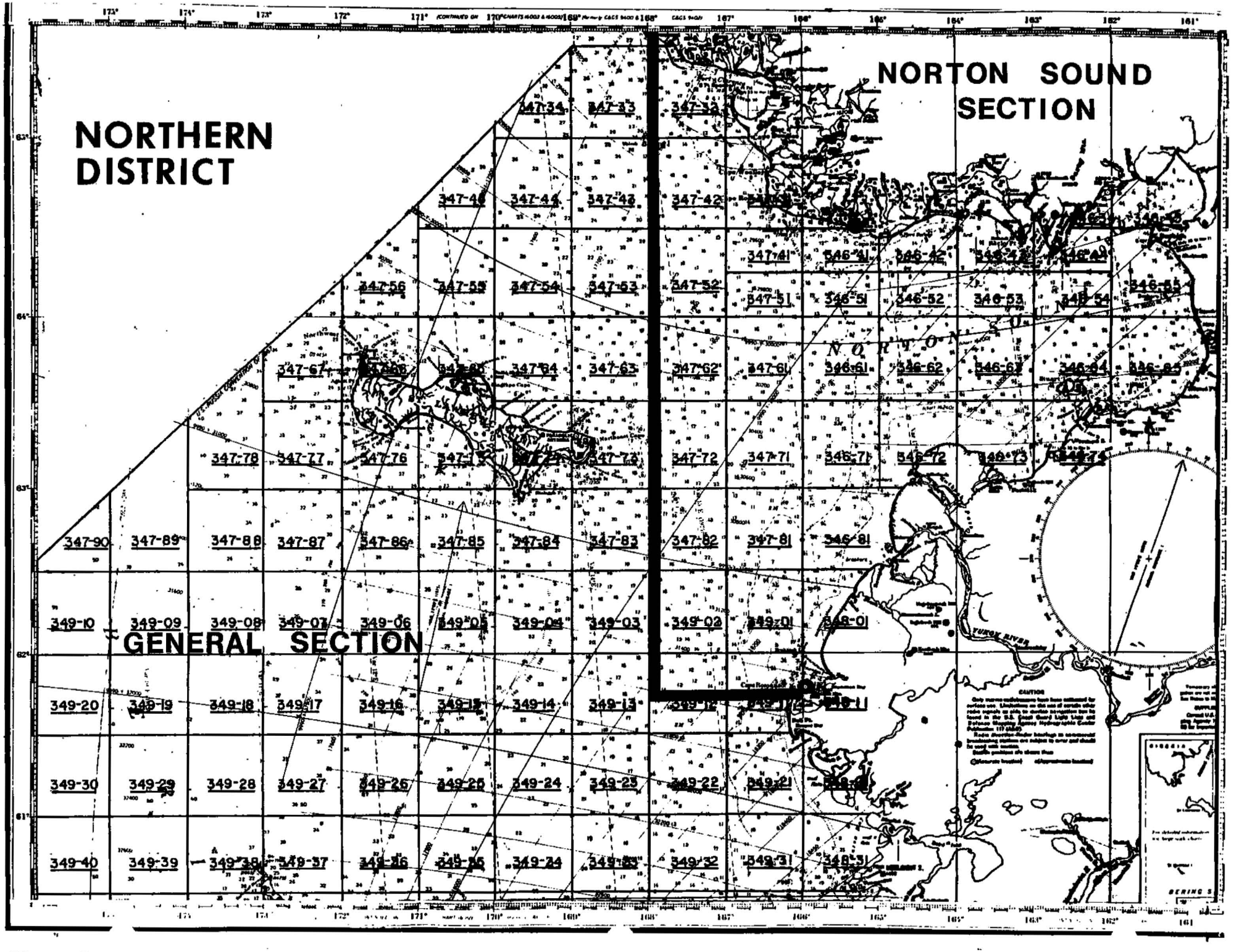


Figure 5. Statistical areas for the Northern District Red King Crab Fishery.

Figure 6. Statistical areas for the Norton Sound Red King Crab Fishery.

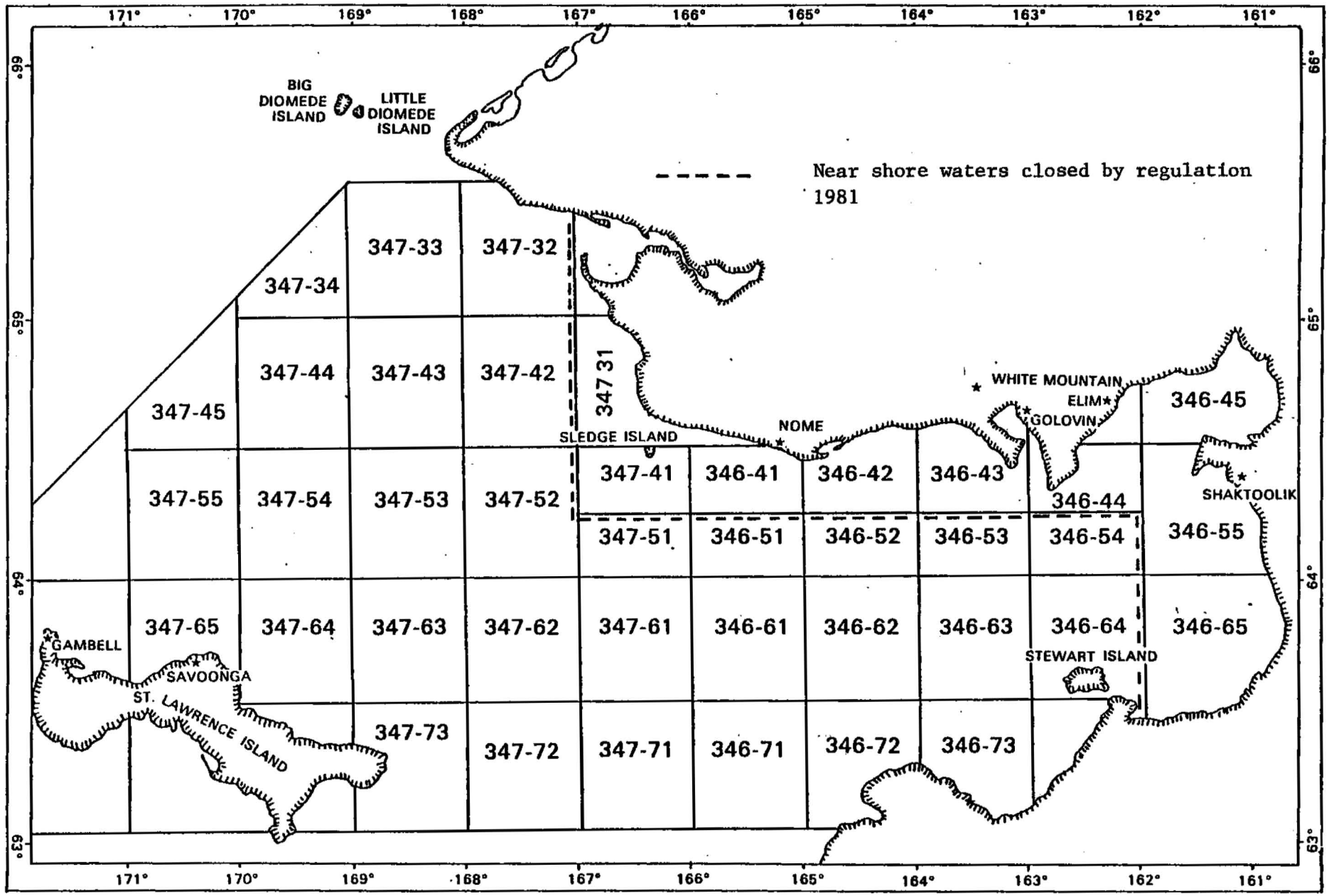


Table 18. Commercial harvest of red king crabs from Norton Sound, Alaska by statistical area, 1982 (Summer fishery only).[1/]

Statistical Area	Landings	Different Vessels	Total Harvest		Total pots lifted	Average Crabs/Pot	Average Weight	Deadloss	
			Number	Pounds				Number	Pounds
346-41	4	3	836	2,832	289	2.9	3.4	0	0
346-42	2	1	230	748	62	3.7	3.3	0	0
346-51	10	8	18,313	60,480	2,310	7.9	3.3	14	50
346-53	5	5	8,169	32,246	1,394	5.9	3.9	4,615	19,892
346-61	5	4	1,072	3,983	605	1.8	3.7	890	3,339
347-42	4	3	1,050	3,513	290	3.6	3.3	0	0
347-51	22	11	21,893	79,580	4,354	5.0	3.6	498	1,792
347-52	6	4	359	1,315	124	2.9	3.7	40	144
347-61	8	5	2,442	8,990	808	3.0	3.7	200	700
347-62	3	3	0	0	45	0	0	0	0
347-71	1	1	31	95	85	< 1	3.1	0	0
346-52	1	1	4,870	17,532	160	30.4	3.6	0	0
347-41	12	7	4,678	17,585	670	7	3.8	127	457
346-64	1	1	6	22	34	< 1	3.7	0	0
Totals	33	12	63,949	228,921	11,230	5.7	3.58	6,384	26,374

1/ Data from Alaska Department Fish and Game, Kodiak printout R80S-11S 11/10/82

Appendix Table 28.

Comparison of annual commercial harvest of red king crabs from Norton Sound, Alaska by statistical areas for years 1977-1982 (Summer fishery only). (Catch in pounds)

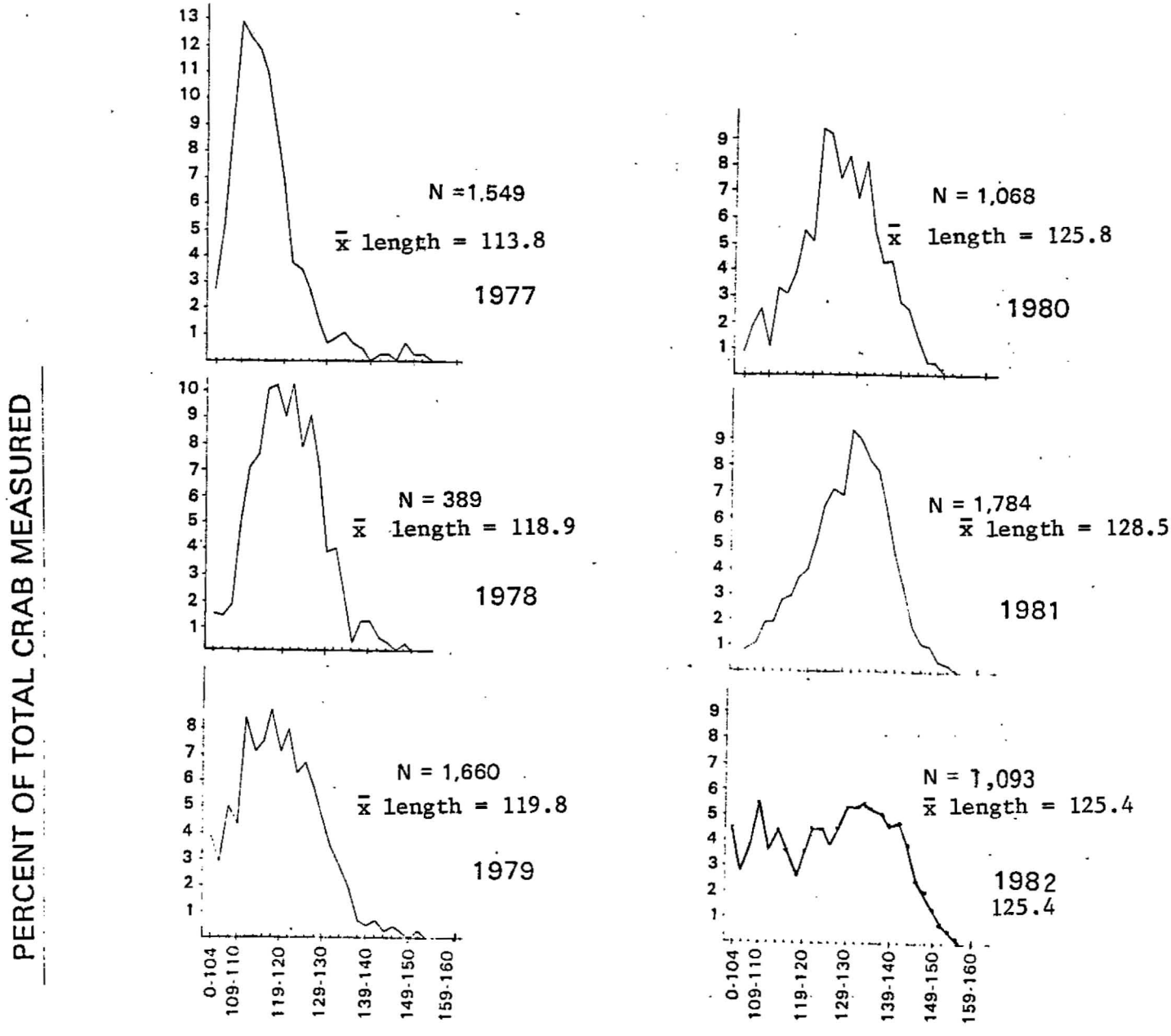
Statistical Subarea	1977	1978	1979	1980	1981	1982	Totals
346-41	306,302	90,187	288,869	918	3,098	2,832	692,206
346-42	80,969					748	81,717
346-44	38,995						38,995
346-51			138,011	121,147	253,387	60,480	573,025
346-52			155,972		1,319	17,532	174,823
346-53				12,398	61,823	32,246	106,467
346-54	31,572			4,830	399		36,801
346-61			323,518	72,735	395,662	3,983	795,898
346-62					4,716		4,716
346-64	40,020					22	40,042
346-65	7,893						7,893
346-71			161,699		15,174		176,873
347-31			146,029				146,029
347-32					36		36
347-41	12,036	515,778	534,938	183,581		17,585	1,263,918
347-42		3,811	12,309	-0-	373	3,513	20,006
347-51		179,212	486,947	205,400	381,510	79,580	1,332,649
347-52		667,130	33,856	274	92,026	1,315	794,601
347-61		353,016	505,050	367,446	141,513	8,990	1,376,015
347-62		51,304	81,798	6,762	18,734	-0-	158,598
347-63			1,860				1,860
347-71		162,795	60,816	84,874	9,167	95	317,747
347-72		13,238		126,231			139,469
347-81		55,490			77		55,567
GRAND TOTALS	517,787	2,091,961	2,931,672	1,186,596	1,379,014	228,921	8,335,951

Appendix Table 29. Commercial harvest of red king crabs from Norton Sound, Alaska (Summer Fishery Only), 1977-1982.

Year	Landings	Different Vessels	Crabs Processed		Deadloss		Total Harvest		Total Pots	Average Crab/Pot	Average Weight	Approximate Ex-vessel price
			Number	Pounds	Number	Pounds	Number	Pounds				
1977	13	7	116,162	305,639	79,715	212,148	195,877	517,787	5,457	36	2.7	0.75
1978	54	8	656,887	1,996,936	33,523	95,025	690,410	2,091,961	10,817	64	3.0	0.95
1979	76	34	819,115	2,503,998	151,847	427,674	970,962	2,931,672	34,773	28	3.0	0.75
1980	50	9	329,778	1,186,596	-0-	-0-	329,778	1,186,596	11,199	29	3.6	0.75
1981	108	36	376,228	1,378,702	85	312	376,313	1,379,014	33,745	11	3.7	0.85
1982	33	11	57,565	202,547	6,384	26,374	63,949	228,921	11,230	6	3.6	2.00
ALL	334	--	2,355,735	7,574,418	271,554	761,533	2,627,289	8,335,951	107,221	24	3.2	--

1/ Fishery in 1977 occurred during July and August.
Fishery in 1978 occurred during August and September.
Fishery in 1979 occurred during last half of July.
Fishery in 1980 occurred during last half of July.
Fishery in 1981 occurred July 15 - August 22.
Fishery in 1982 occurred August 9 - September 1.

Figure 7 . Red King Crab commercial catch samples for the Norton Sound Summer Fishery 1977-1982.



pendix Table 30. Catch of red king crabs in Norton Sound during research surveys and resulting population estimates. 1976-1982

King crab survey Date	Days	Agency	Vessel	Method	# of crabs captured 1/ Sublegal males	Legal males	females	Average legal crab per pot	Population estimates Legal males Numbers	Pounds	Commercial harves Pounds	Weight
1976 9/2-9/5 9/16-10/7	13	NMFS	Miller-Freeman	Trawling 158 tows	768	555 2/	180		3,119,800	8,111,480	none	--
1979 7/26-8/5	11	NMFS	Miller-Freeman	Trawling 71 tows	46	194 3/	40		837,241	2,511,723 5/	2,931,672	3.0
1982 9/5-9/11	7	NMFS	Miller-Freeman	Trawling 50 tows	322	107 4/	265		970,646	2,620,744 6/ 7/	228,921	3.6
1980 7/4-7/14	11	ADF&G	Altair	Pots 397	443	3,290 8/	158	8	1,900,00	6,600,000 9/10/	1,186,596	3.4 11/
1981 6/28-7/14	17	ADF&G	Altair	Pots 718	4,097	3,415	1,933	5	1,285,195	4,755,221	1,379,014	3.7
1982 7/6-7/20	16	ADF&G	Aleution #1	Pots 689	5,019	2,001	424	3	353,273	1,271,783	228,921	3.6

1/ Number of crab captured on ADF&G surveys represents data standardized for a 24 hour soak period. This data is edited and finalized.

2/ Legal males include all crab of 106 mm and greater carapace length.

3/ Legal males include all crab of 105 mm and greater carapace length.

4/ Legal males include all crab of 103 mm and greater carapace length. ADF&G research has shown 103 mm is the point where over 50% of the crab that length are of legal width.

5/ Estimate of crab left on grounds immediately after the 1979 commercial fishery.

6/ Estimate of crab left on grounds immediately after the 1982 commercial fishery. The molt was in progress during the survey so this estimate also includes some recruitment as well as the remaining legal crab.

7/ The poundage for the 970,646 estimated legal crab was derived by comparing the 1982 research average legal crab length of 113 mm to the 1977 commercial fishery which had a similar average length of 115 mm and an average weight of 2.7 pounds.

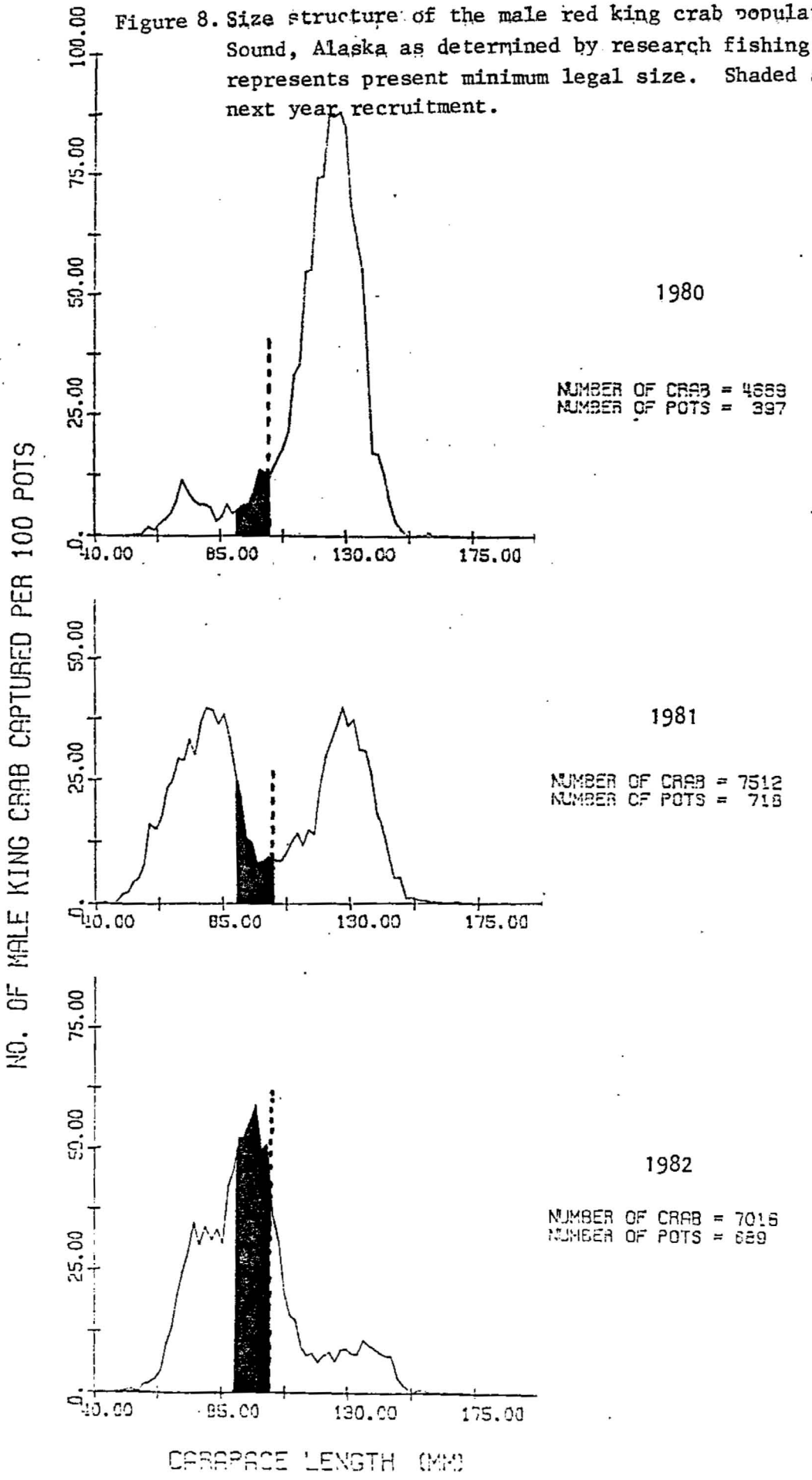
8/ Legal male crab captured on ADF&G research surveys are crab with carapace width equal to or greater than 4 3/4 inches regardless of length.

9/ ADF&G estimates are calculated using the Peterson mark and recapture methods. Estimates are for legal male crab prior to the commercial fishery.

10/ The 1980 estimate has been revised from the original estimate o 13.4 million pounds. The original estimate was inaccurate due to inadequate recovery of tagged crab.

11/ Obtained from actual samples taken aboard the BILLIKEN.

Figure 8. Size structure of the male red king crab population, Norton Sound, Alaska as determined by research fishing. Dotted line represents present minimum legal size. Shaded area represents next year recruitment.



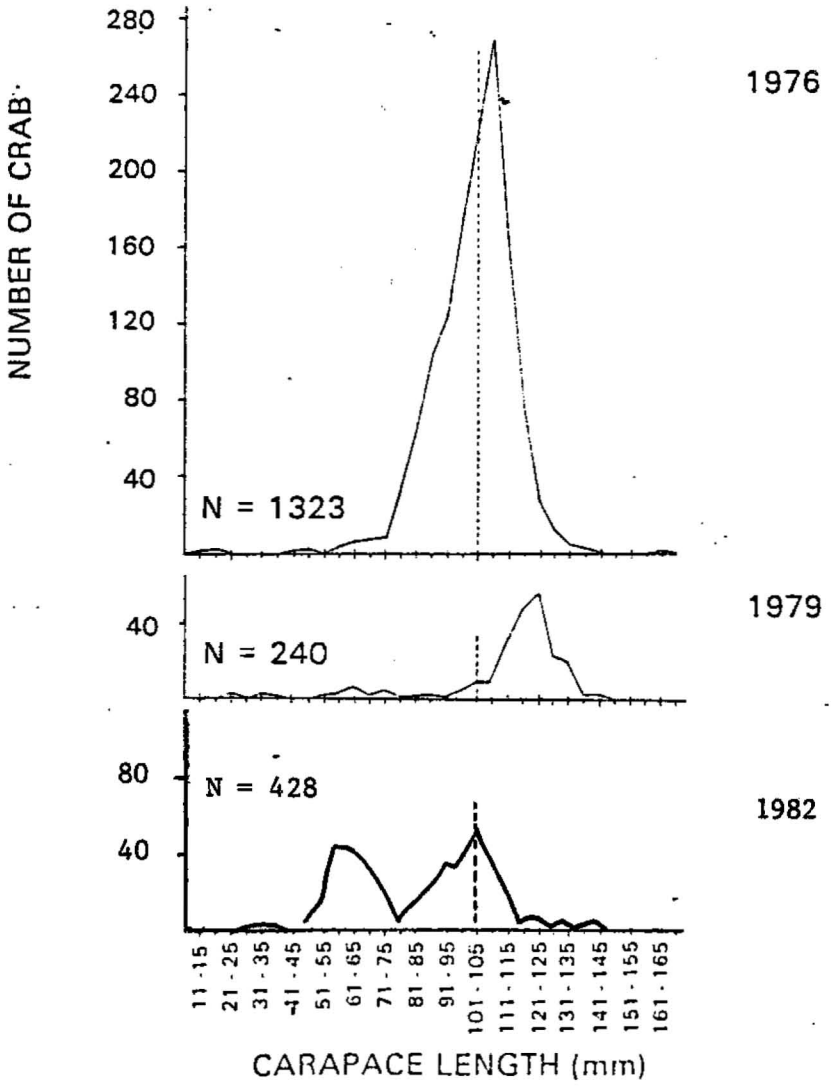


Figure 9. --Size structure of the male red king crab population, Norton Sound, Alaska as determined by research fishing. Dotted line represents present minimum legal size. 1976-1982 NMFS Trawl.

Section 4
MISCELLANEOUS SPECIES

Section 4 MISCELLANEOUS SPECIES

Introduction

Several species other than salmon, crab, and herring are utilized for commercial and subsistence purposes in the Norton Sound, Port Clarence and Kotzebue districts. Primary species include inconnu or "sheefish" (Stenodus leucicthys), whitefish (Coregonus sp., Prosopium sp.,) Arctic char (Salvelinus alpinus) and saffron cod (Eleginus gracilis).

These fish are taken by set gillnets, beach seines, "jigging" through the ice and rod-and-reel. Subsistence catches taken during the summer months are normally sun-dried, while catches made during the winter are stored frozen. Many of these fish are used for human consumption, but a significant percentage are fed to dogs. Fish taken for commercial purposes are mainly sold locally, although some are shipped from the area.

Subsistence harvests of most of these miscellaneous species are not limited by regulation. Commercial harvests may be prohibited in some freshwater areas, but limited commercial endeavors are allowed in many areas under terms of a permit.

Inconnu

Inconnu are found in the Kobuk-Selawik River drainages of Kotzebue Sound and in some Norton Sound drainages, but they are primarily utilized within the former area (Figure 10). In the Kotzebue Sound area, adult fish migrate to upriver spawning areas after ice break-up and migrate to over-wintering areas within the Hotham Inlet-Selawik Lake areas during October-November. Although inconnu are capable of consecutive spawning, most fish spawn every two to three years. Inconnu mature slowly with males reaching maturity at 5-7 years of age and females at 7-11 years.

The inconnu's spawning and overwintering migration behavior allows them to be available for harvest by the various fisheries throughout their life cycle, which renders them highly susceptible to overharvest. In addition, the inconnu's slow maturation rate increases the difficulty of restoring depleted populations.

During the 1960's age, sex, and length data indicated stocks were being overharvested by the commercial and subsistence fisheries in the Kotzebue district. Consequently, an annual area commercial harvest quota

Appendix Table 31. Winter commercial and subsistence Red King Crab catches, Norton Sound 1978-1982 [1/].

	Commercial			Subsistence				
Winter [2/]	Effort	Crab	lbs.	Permits Issued	Permits Returned	# Who Fished	Crab	lbs.
1977-1978	37	9625	25193	290	206	263 [3/]	18618 [3/]	48408 [3/]
1978-1979	1	221	641	48	43	38	224	582
1979-1980	1	22	75	22	14	9	213	554
1980-1981	0	0	0	51	39	23	360	1332
1981-1982	1	17	-	101	76	54	1288	

1/ 1978-1982 represents finalized and re-checked data.
2/ Nov. Dec. Jan. Feb. March April. Each winter has months in two calendar years
3/ Represents expanded data.

of 25,000 pounds of inconnu was instituted, although subsistence catches remained unrestricted.

Commercial Fishery

Most of the commercial fishing effort occurs near Kotzebue in Hotham Inlet. Fishermen use gillnets ranging from 5 1/2" - 8" stretched mesh which they fish under the ice. Recorded commercial catches have remained relatively small; however, undocumented catches are believed to be significant and therefore harvest totals should be considered minimum estimates. During the winter of 1981-1982 one buyer reported buying 17,396 pounds of sheefish. Although numbers of fish were not reported, an estimate based on the historical average weight of 6.61 pounds is 2,632 sheefish (Appendix Table 32).

The lack of a market outside the Kotzebue region limits commercial activities greatly and most individuals who normally participate in the winter commercial fishery also fish for subsistence purposes. Historical catch data is presented in Appendix Tables 32 and 33.

Subsistence Fishery

Inconnu have long been utilized for subsistence purposes throughout the Kotzebue Basin. Fishermen along the upper Kobuk River fish for Inconnu during June through October, while the lower Kobuk and Selawik River residents fish during April through June. Kotzebue and Selawik fishermen fish in Hotham Inlet and Selawik Lake during the winter months.

During the winter of 1981-1982 Kotzebue district subsistence fishermen reported taking 6,651 inconnu (Appendix Table 33). This data was collected from returned questionnaires which were mailed out in the fall. Since not all fishermen were contacted or returned completed questionnaires, harvest figures should be considered minimum estimates.

During the summer and fall of 1982 (May through September) information on subsistence harvest of inconnu was collected from both mailed questionnaires and personal interviews. A total catch of 4,364 inconnu was reported by Kobuk River residents during the summer of 1982. Kotzebue Sound fishermen also reported a catch of 340 inconnu during the summer with the subsistence fishery targeting primarily on salmon, whitefish, and char (Table 19.)

During the summer and fall, subsistence sheefish harvest in the Kotzebue District is estimated to be 5,005 fish (Table 19). This estimate was the result of multiplying the total number of fishermen in each village known to harvest sheefish, whether they were interviewed or not, by the average catch of the subsistence fishermen interviewed in each village. This extrapolation was only done in villages with significant catches of sheefish (i.e. Kotzebue and the Kobuk River villages) and should be considered conservative as it is probable that not all subsistence fishermen were identified.

Escapement

Annual aerial surveys have been conducted on key inconnu spawning areas. These surveys have primarily been conducted along the upper Kobuk River during September. A total of 250 inconnu were counted in September of 1981 in the Kobuk River. None were seen at all during 1982. Species identification has been a problem since 1980. Escapement figures during the last three years are probably low due to this factor and also due to poor aerial survey conditions. Past data is presented in Appendix Table 34. Although escapement data is incomplete there is no evidence of declining populations of sheefish in the Kotzebue District.

Figure 10. Kotzebue and Kobuk River valley villages.

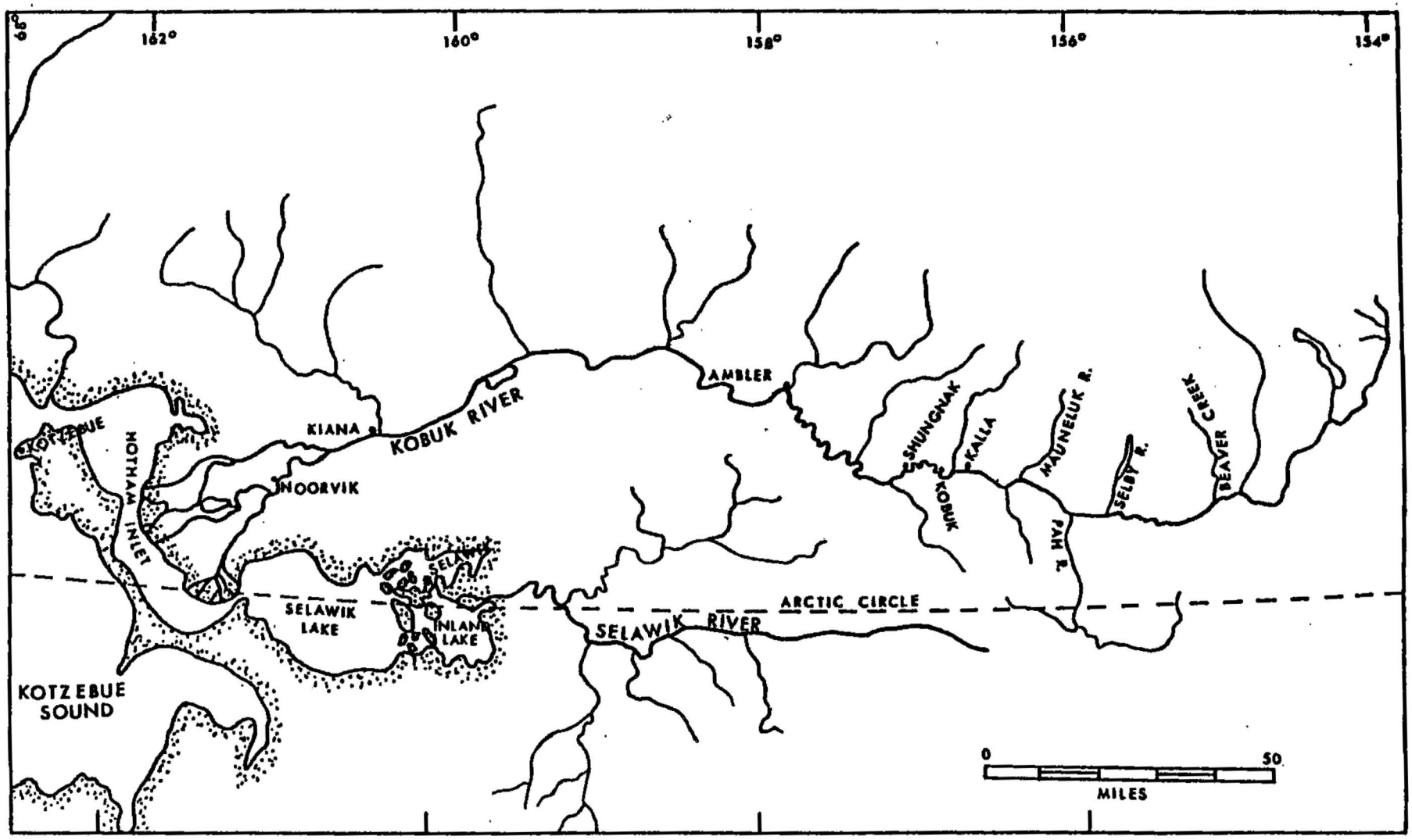


Table 19 Estimates of subsistence catches of sheefish, by village, May through October, Kotzebue district, 1982.

Village	# fishermen interviewed	# of known fisherman not contacted	Sheefish catch Reported Catch	Average Catch	Extrapolated catch estimate
Kobuk	3	0	1900	633	1900
Shungnak	16	1	1610	101	1711
Ambler	15	2	732	49	830
Kiana	20	6	63	3	82
Noorvik	23	0	59	3	59
Kobuk Totals	77	9	4364	-	4582
Noatak	29	2	0	0	0
Selawik	4	0	0	0	0
Kotzebue/ Sheshalik	49	12	340	7	423
Deering 1/	10	0	0	0	0
Kivalina 1/	35	0	0	0	0
Kotzebue District Totals	204	23	4704	-	5005

1/ Data from Steve Braund and Associates

Appendix Table 32. Winter commercial inconnu catch data, Kotzebue, 1966-1982[1/]

Year	Number of fishermen	Number of Fish	Pounds Total	Pounds Avg.	Price(per pound)
1966-67	2/	4,000	26,000	6.5	1.30[3/]
1967-68	10	992	5,952	6.0	.22
1968-69	17	2,375	15,437	6.5	.25
1969-70	2/	2,206	1/	1/	.14
1970-71	4	350	3,407	9.7	1.30[3/]
1971-72	5	456	23,207	6.4	.16
1972-73	11	2,325	15,626	7.3	.20
1973-74	6	2/	6,265	5.8	.30
1974-75	2/	2/	24,161	9.5	.30
1975-76	14	2,633	19,484	7.4	.30
1976-77	2	566	5,004	9.0	.30
1977-78	11	2,879	26,200	9.8	.40
1978-79[4/]					
1979-80	4	1,175	8,225	7.0	.50
1980-81	1	278	1,836	6.6	.75
1981-82	11	2,632 [5/]	17,396	2/	.75

1/ Data is not exact: e.g. in some instances total catch poundages were determined from average weight and catch data. Similarly, various price/pound figures were determined from price/fish and average weight data.
2/ Data unavailable.
3/ Price/fish.
4/ No reported commercial catches.
5/ Estimate based on historical average weight.

Appendix Table 33. Subsistence and commercial Inconnu catches, Kotzebue district, 1966-1982.

Village	Fishermen Interviewed	Number of Inconnu	Fishermen Interviewed	Number of Inconnu
	1966-1967		1967-1968	
SUBSISTENCE				
Kobuk	7	99	5	270
Shungnak	11	166	13	837
Ambler	11	194	14	559
Subtotal	29	459	32	1,666
Kiana	19	925	25	766
Noorvik	28	3,792	35	1,910
Selawik	29	7,164	38	5,080
Subtotal	76	11,881	98	7,756
Kotzebue	30	10,060	48	21,871
Subtotal	135	22,400	146	31,293
COMMERCIAL				
Kotzebue	10	922	17	2,375
TOTALS	145	23,322	163	33,668
	1968-1969		1970	
SUBSISTENCE				
Kobuk	11	553	4	158
Shungnak	17	530	19	608
Ambler	20	554	12	125
Subtotal	48	1,637	35	891
Kiana	22	409	25	790
Noorvik	20	1,324	46	7,126
Selawik	35	4,140	29	1,601
Subtotal	77	5,873	100	9,517
Kotzebue	19	4,362	33	3,520
Subtotal	144	11,872	168	13,928
COMMERCIAL				
Kotzebue	-	2,206	4	350
TOTALS	144	14,078	172	14,278

Appendix Table 33. Subsistence and commercial Inconnu catches, Kotzebue district, 1966-1982.
(continued)

Village	Fishermen Interviewed	Number of Inconnu	Fishermen Interviewed	Number of Inconnu
	1971		1972	
SUBSISTENCE				
Kobuk	5	1,068	7	12
Shungnak	20	671	10	639
Ambler	13	711	6	350
Subtotal	38	2,450	23	1,001
Kiana	25	1,060	17	307
Noorvik	32	5,975	21	2,213
Selawik	27	3,416	-	-
Subtotal	84	10,451	38	2,520
Kotzebue	33	682	18	311
Subtotal	155	13,583	79	3,832
COMMERCIAL				
Kotzebue	5	456	11	2,325
TOTALS	160	14,039	90	6,157
	1973		1974	
SUBSISTENCE				
Kobuk	7	226	5	108
Shungnak	9	195	7	127
Ambler	5	83	10	257
Subtotal	21	504	22	492
Kiana	25	-	15	51
Noorvik	19	4,384	21	519
Selawik	-	-	-	-
Subtotal	44	4,384	36	570
Kotzebue	-	-	-	-
Subtotal	65	4,883	58	1,062
COMMERCIAL				
Kotzebue	6	-	-	-
TOTALS	71	4,888	58	1,062

Appendix Table 33. Subsistence and commercial Inconnu catches, Kotzebue district, 1966-1982. (continued)

Village	Fishermen Interviewed	Number of Inconnu	Fishermen Interviewed	Number of Inconnu
	1975		1976	
SUBSISTENCE				
Kobuk	6	255	8	99
Shungnak	14	540	15	539
Ambler	12	114	8	60
Subtotal	32	909	31	698
Kiana	15	68	20	58
Noorvik	22	660	6	210
Selawik	-	-	-	-
Subtotal	37	728	26	268
Kotzebue	-	-	-	-
Subtotal	69	1,637	57	966
COMMERCIAL				
Kotzebue	14	2,633	2	1,060
TOTALS	83	4,270	59	2,036
	1977		1978	
SUBSISTENCE				
Kobuk	8	185	7	365
Shungnak	17	365	18	185
Ambler	7	216	17	185
Subtotal	32	766	32	766
Kiana	20	165	20	165
Noorvik	16	94	16	94
Selawik	15	285	15	285
Subtotal	51	544	51	544
Kotzebue	12	500	12	500
COMMERCIAL				
Kotzebue	11	2,879	0	0
TOTALS	106	4,689	95	1,810

Appendix Table 33. Subsistence and commercial Inconnu catches, Kotzebue district, 1966-1982. (continued)

Village	Fishermen Interviewed	Number of Inconnu	Fishermen Interviewed	Number of Inconnu
	1979		1980	
SUBSISTENCE				
Kobuk	6	85	4	200
Shungnak	16	741	11	470
Ambler	15	624	5	160
Subtotal	37	1450	20	830
Kiana	14	385	12	478
Noorvik	17	1973	7	1014
Selawik	7	175	15	795
Subtotal	38	2535	54	2287
Kotzebue	-	-	-	-
Subtotal	75	3985	74	3117
COMMERCIAL [1]			COMMERCIAL [1]	
Kotzebue	4	1175	1	278
TOTALS	79	5160	75	3395
	1981		May through September 1982	
SUBSISTENCE				
Kobuk	4	433	3	1900
Shungnak	3	859	16	1610
Ambler	4	99	15	732
Subtotal	11	1391	34	4242
Kiana	8	481	20	63
Noorvik	10	1429	23	59
Selawik	12	1443	4	0
Subtotal	30	3353	47	122
Kotzebue	10	1902	49	340
Noatak	11	5	29	0

Appendix Table 33. Subsistence and Commercial Inconnu catches, Kotzebue District, 1966-1982 (continued).

Village	Fishermen Interviewed 1981	Number of Inconnu	Fishermen Interviewed May through September 1982	Number of Inconnu
Subsistence Subtotal	62	6651	159	4704
Commercial [1/]	11	2632 [4/]	[2/]	3 [3/]
Totals	73	9283	[2/]	[2/]

1/ Commercial catch includes sheefish caught during fall of year listed plus the spring of the next year ie. 1981 commercial catch consists of those fish caught during the fall of 1981 after freezeup until breakup in the spring of 1982.

2/ Data not available, fishery still in progress.

3/ Incidental deliveries made during salmon fishery-limited market many more sheefish caught but not sold.

4/ Number represents estimate based on total poundage divided by historical average weight.

Appendix Table 34. Annual aerial survey counts of Inconnu in the Kobuk and Selawik Rivers, 1966-1982.

Date	Kobuk River	Selawik River	Total
9/5/66	1,200		1,200
9/22/67	1,025		4,359
9/14/68	4,973	1,234	6,207
9/10/69	3,654	3/	3,654
9/5/70	3,220		3,220
8/30/71	8,166		8,166
8/22/72	1/		
1973	2/		
8/21/74	1/		
8/24/75	1/		
9/2/76	73		73
1978	2/		
1979	2,824		2,824
1980	1,772		1,772
1981	250 4/		250
1982	1/		1/

1/ No fish reported

2/ Not surveyed

3/ Not surveyed since 1968

4/ Probably more Inconnu than listed; species identification problems

ARCTIC CHAR

Introduction

Arctic char (Salvelinus alpinus Linnaeus) are found throughout the Norton Sound, Port Clarence and Kotzebue districts. The Arctic char and Dolly Varden are close relatives, but taxonomists disagree on their relationship. This report will refer to these fish as Arctic char.

Arctic char spawn non-consecutively in the fall and fry emerge from the gravel in the spring. They migrate to the ocean during the summer months to feed and return to freshwater during the fall. These fish are susceptible to overharvest by various fisheries since they mature relatively slowly (e.g. females normally mature at age seven) and are available for harvest for several years. Consequently, commercial fisheries have been maintained at low levels or have been prohibited in specific areas to reduce the potential for overharvest and provide for both reproductive and subsistence fishery needs.

Commercial Fishery

Arctic char have been taken on a limited basis by permit in the Norton Sound district, while no commercial catch has been allowed in the Port Clarence district due to the subsistence requirements of local residents. Char have been taken incidentally to the chum salmon fishery in Kotzebue, but regulatory actions taken in 1976, which closed this commercial salmon fishery on August 31, has attempted to reduce this harvest (Appendix Table 35).

In 1982, two permits were issued for the commercial harvest of arctic char in Norton Sound ocean waters of the Nome subdistrict, and one permit was issued for the Unalakleet River. With a 2,500 pound subdistrict quota in effect, the two Nome fishermen landed 1,273 pounds of char (708 fish) using set gill nets of 4 1/2 inch mesh or less. A few incidental catches were also sold locally by Nome commercial salmon fishermen. The permit holder operating on the Unalakleet River made one delivery of 185 pounds (115 fish).

In the Kotzebue District a total of 3,447 arctic char were reported taken incidentally in the commercial chum salmon fishery. This was the third largest incidental catch of char since the commercial salmon fishery began in 1962. (Appendix Table 35). Most of these char were taken during the last two weeks in August (Table 20). Since the price paid for char is relatively low, (Appendix Table 36) and it is highly prized as a food fish, many commercial fishermen do not sell their incidental catches and consequently commercial harvest figures presented do not completely reflect the actual catch.

Subsistence Fishery

Arctic char are taken for subsistence purposes by beach seine, gillnet or "jigging". These fish are normally caught during the early spring and late fall when they are migrating to or from ocean waters. They are dried or frozen and used for human consumption, dog food or trapping bait.

Most villagers in the Norton Sound District report incidental catches of char in their subsistence salmon nets. However, the bulk of the catch is taken by seining in the late fall, after Department subsistence surveys have been conducted, making it difficult to estimate the total subsistence catch in Norton Sound district.

In the Kotzebue district, the largest catches of arctic char are the result of subsistence efforts by residents of Noatak and Kivalina in the late fall by seining. Over wintering char are harvested throughout the winter by hook and line through the ice and by seine in open water areas of the Wulik, Kivalina and Noatak Rivers.

Although winter catches have not been documented, the 1982 fall catch of char, through October 25, by the village of Noatak was documented while conducting interviews on subsistence salmon fishing. A research firm, Stephen Braund and Associates, compiled harvest information on char taken by villagers of Kivalina. Small catches of char were also reported by subsistence fishermen in some of the Kobuk River villages as well as residents of the Kotzebue area. Reported and estimated total catches of char by village is reported in Table 21. A total District subsistence harvest of 20,740 char was estimated during the months of May through October 1982. As a result of low catches of salmon this year, harvest effort of char by residents of Noatak is anticipated to be larger than usual.

Escapement

Escapement data is limited, but a high count of 300,000 char was obtained in the Wukik River during 1969 (Appendix Table38). Weather and water conditions have precluded aerial surveys during many years but interviews of local fishermen and observations by Department biologists have not indicated any major population declines. Division of Sport Fisheries personnel routinely conduct aerial surveys of the spawning grounds on the Noatak River in the summer and overwintering areas of the Kivalina and Wulik Rivers in the fall. A total of 6,088 char was observed spawning in key index streams of the Noatak River drainage during 1982. Surveys conducted in September documented 10,932 and 65,581 overwintering char in the Kivalina and Wulik River drainages, respectively. The above overwintering char counts are significantly below average. (Appendix Table 38).

Table 20. Daily incidental commercial arctic char catches in Kotzebue salmon fishery, 1982.

Dates	# char delivered	Cumulative char delivered
7/8-8/16	0	0
8/17	118	118
8/18	24	142
8/19	52	194
8/20	240	434
8/21	252	686
8/22	413	1099
8/23	1104	2203
8/24	1155	3358
8/26	0*	3358
8/27	0*	3358
8/28	89 1/	3447

* no market -char either dumped or taken home

1/ limited market - char either dumped or taken home

Table 21 Subsistence catches of arctic char, by village, May through October, Kotzebue district, 1982.

Village	# fishermen interviewed	# of known fishermen not contacted	Arctic Char Catch Reported catch	Average catch	Extrapolated catch Estimate
Kobuk	3	0	0	0	not expanded
Shungnak	16	1	20	1	" "
Ambler	15	2	65	4	" "
Kiana	20	6	13	1	" "
Noorvik	23	0	137	5	" "
Kobuk totals	77	9	235	-	--
Noatak	29	2	2503	86	2676
Kotzebue/ Sheshalik	49	12	460	9	573
Deering	10	0	0	0	0
Selawik	4	0	0	0	0
Kivalina 1/	35	0	17256	-	17256
Kotzebue District totals	204	23	20454	-	20740

1/ Data from Stephen Braund and Associates includes fall harvest only. Does not include through the ice catches made during early spring and winter of 1982.

Appendix Table 35. Incidental commercial Arctic char catches, Kotzebue, 1966-1982.

Year	Number of Fish[1/]	Pounds[6/]
1966	3,325	1/
1967	367	2,606
1968	3,181	21,949
1969	1,089[2/]	5/
1970	2,095	5/
1971	3,828[3/]	23,353
1972	7,746	56,545
1973	640	4,608
1974	2,605[4/]	20,580
1975	5/	5/
1976	5/	5/
1977	5/	5/
1978	1,229	9,094
1979	2,523	12,523
1980	3,049	17,015
1981	3[7/]	16
1982	3,447[8/]	23,648

1/ Reported 7-10 pound average
2/ Includes 269 taken by permit
3/ Includes 179 taken by permit
4/ Includes 234 taken during commercial inconnu fishery
5/ No catch/poundage reported
6/ Some data extrapolated from average weight reported
7/ No market for Char this year many more Char either used for subsistence or dumped.
8/ Limited market many char either utilized at home or dumped

Appendix Table 36. Average weights and prices, Arctic char, Kotzebue, 1966-1982.

Year	Average Weight	Average Price
1966	1/	.553/
1967	7.1	.11
1968	6.9	.14
1969	2/	2.843/
1970	2/	2/
1971	6.4	.16
1972	7.3	.17
1973	7.2	.16
1974	7.9	.16
1975	2/	2/
1976	2/	2/
1977	2/	2/
1978	7.4	.15
1979	5.0	.25
1980	5.6	.20
1981	5.6	.17
1982	6.9	.20

1/ Reported 7-10 pound average

2/ Data not available

3/ Price per fish

Appendix Table 37. Subsistence catches of Arctic Char documented in Kivalina and Noatak, 1959-1982.

Year	Kivalina		Noatak	
	Number	Pounds	Number	Pounds
1959 [1]		97,600 [2]		
1960 [1]		124,300		
1962			27,623	
1963			4,130	
1968	49,512	120,214		
1969	64,970	152,750	32,350	
1970	33,820	79,420	3,700	
1971	29,281	68,518	5,320	
1972	48,807	114,637	1,492	
1973 [3]				
1979	31,417 [4]		9,060	
1980	[5]		7,220	
1981	[5]		3,056	
1982	17,256 [6]		2,676 [7] [3]	

1/ From Saario, Doris J. and Brina Kessel, Environment of the Cape Thompson Region, Alaska, published by the U.S. Atomic Energy Commission, 1966.

2/ Includes approximately 12,000 pounds of whitefish

3/ Storm and ice conditions prevented fall harvest

4/ Harvest data from Sport Fish Division survey.

5/ No data available.

6/ Harvest data from Stephen Braund and Associates

7/ Expanded estimate (see text on subsistence fishery)

Appendix Table 38. Arctic char aerial survey counts Kotzebue district, 1968-1982.

YEAR	Noatak River [1] Drainage Index Streams	Wulik River [2]	Kivalina River [2]
1968		90,236	27,640
1969 [2]	21,000 [3]	297,257	
1976		68,300	12,600
1977 [4]			
1978 [4]			
1979 [5]		55,030	15,744
1980	45,185 [3]	113,553 [5]	39,692 [5]
1981 [5]	5,873	101,800	45,000
1982 [5]	6,088	65,581	10,932

1/ Includes summer spawner count on the Kelly and Kugururok Rivers, tributaries of the Noatak, conducted in July.
2/ Overwintering char counts conducted in September.
3/ Incomplete survey
4/ Poor weather hampered/prevented survey.
5/ Sport Fish Division survey.

Whitefish

Introduction

Although inconnu belong to the whitefish family, this section deals with several smaller species of the genera Coregonus and Prosopium. The genus Coregonus contains the "broad" and "humpback" whitefish or C. nasus and C. pidschian, respectively. In addition, three whitefish species known as "ciscoes" belong to this genera; i.e. the least cisco (C. sardinella), Arctic cisco (C. autumnalis) and Bering cisco (C. laurettae). "Round" whitefish (Prosopium cylindraceus) are the sole representative of this genus in this area.

Whitefish normally spawn in the fall. Growth varies from species to species and river to river, but mature adults normally weigh from one to three pounds.

These fish are used to a limited extent by the commercial and sport fisheries within the area, but are uniformly important to the various subsistence fisheries. Area commercial harvest quotas of 2,500 pounds have been instituted to protect various stocks. Commercial harvests have been further limited or prohibited in areas where subsistence use occurs.

Commercial Fishery

Limited commercial whitefish harvests have been allowed since statehood, normally under the auspices of a permit which delineated harvest levels, open areas, legal gear etc. Commercial whitefish fisheries have generally been limited to large open water areas (e.g. Grantley Harbor in the Port Clarence district) or ocean waters. Beach seines have been stipulated as legal gear in some instances in order to reduce the number of incidental species taken. Little comparative commercial catch and effort data has been recorded, but harvest levels have historically been low. A majority of the commercial catches have been made in Golovin Bay within Norton Sound, near the Kuzitrin River in the Port Clarence district and Hotham Inlet near Kotzebue. These fish have been sold to local markets, for human consumption, dog food or, more recently, crab bait.

In 1966, six fishermen sold 1,156 pounds of whitefish, primarily the humpback variety. One fishermen operated in the Kuzitrin drainage during 1977, 1978 and 1979 harvesting a total of 2,734 pounds (1,127 fish) during these three years. During 1980, two fishermen reported selling 1,667 pounds of whitefish (794 fish) which they caught in the Kuzitrin River. In addition one fishermen reported taking 241 pounds of whitefish (279 fish) in ocean waters near Nome. No commercial landings were made during 1981.

During 1982 two permits were issued to commercially harvest whitefish. One permit allowed a harvest of 2,500 pounds of whitefish from ocean waters in the Nome area. A total of 54 pounds (35 fish) was sold locally. The other permit was issued to allow harvest of whitefish from the Kuzitrin River. No commercial deliveries were reported on this permit.

Subsistence Fishery

Whitefish have been taken mainly by beach seine or set gillnets. These fish are usually dried and used for human consumption or dog food. In some areas fish are "gutted" and dried early in the summer, while later in the summer the fish are filleted and dried with the eggs and viscera intact.

Subsistence catch enumeration is difficult since fishermen do not count fish individually, but by "tubs", "bags", "strings" or other estimators of gross abundance. Additionally, many fish have been dried and consumed or stored in catches prior to the survey period. As a result, the subsistence catch and effort data should be considered as minimum (Appendix Table 39).

Escapement

Whitefish escapements have not been monitored in the past, but there have been no indications from limited Department observations or fishermen interviews of declining populations.

Appendix Table 39. Subsistence whitefish catch and effort data, Kotzebue district, 1970-1982. 1/

Year	Fishermen Interviewed	Number of Fish
1970		58,165
1971		36,012
1974-1976	2/	2/
1977		30,810
1978		77,474
1979	123	43,653
1980	67	49,106
1981	71	37,746
1982	2/	2/

1/ Data unabailable prior to 1970. Harvest figures must be considered minimal since not all fishermen were contacted.

2/ Data unavailable

Saffron Cod

Tomcod are extensively utilized as a subsistence resource in the Norton Sound, Port Clarence, and Kotzebue districts. Tomcod are taken through the ice by jigging as well as with gillnets in open water.

There has never been an extensive commercial fishery on tomcod in the Norton Sound, Port Clarence, or Kotzebue areas. During 1980, one fisherman caught and sold 89 pounds (98 tomcod) in the Nome subdistrict. There were no commercial landings during 1982.

The Alaska Native Foundation undertook a feasability study for the development of a dried tomcod fishery in the Port Clarence/Shishmaref area. Samples were taken to prospective buyers and various markets are still being analyzed. If marketing conditions improve and if local residents are willing to participate in a labor intensive dried tomcod fishery, a commercial fishery for tomcod could develop.

Miscellaneous Finfish Species

Besides the species of fish already mentioned in this report, other finfish species are targets of subsistence fishing effort in the Norton Sound-Port Clarence-Kotzebue area. They include: rainbow smelt(boreal smelt), capelin, northern pike, starry flounders, yellow fin sole, arctic flounder, Alaska plaice, grayling, burbot.

Subsistence utilization of these species has been documented although effort and catch vary widely in scale and importance with locality. Some of these species are important to the subsistence communtiy in certain localities during specific seasons of the year. None of these species are harvested commercially in the Norton Sound-Port Clarence-Kotzebue area at this time.

Addendum 1. List of common and scientific names of finfish species of the Norton Sound-Port Clarence-Kotzebue districts.

Common Name	Scientific Name
Arctic lamprey	Lampetra japonica
Arctic char	Salvelinus alpinus
Arctic cod	Boreogadus saida
Arctic flounder	Liopsetta glacialis
Arctic grayling	Thymallus arcticus
Alaska plaice	Pleuronectes quadrituberculatus
Burbot	Lota lota leptura
Bering cisco	Coregonus laurettae
Bering poacher	Ocella dodecaedria
Bering wolffish	Anarhicas orientalis
Blackfish	Dallia pectoralis
Boreal smelt (rainbow-toothed)	Osmerus epselanus
Broad whitefish	Coregonus nasus
Capelin	Mallotus villosus
Pond smelt	Hypomesus olidus
Humpback whitefish	Coregonus pidschian
Inconnu (sheefish)	Stenodus leucichthys
Lake trout	Salvelinus namaycush
Least cisco	Coregonus sardinella
Longhead dab	Liranda proboscidea
Ringtail snailfish	Liparis rutteri
Northern pike	Esox lucius
Longnose sucker	Catostomus catostomus
Pricklebacks	Stichaeidae
Pacific herring	Clupea harengus pallasi
Rock flounder	Lepidosetta bilineata
Rock greenling (terpug)	Hexagrammus lagocephalus
Round whitefish	Prosopium cylindraceum
Sculpins	Cottidae
Pink salmon	Oncorhynchus gorbuscha
Chum salmon	Oncorhynchus keta
Coho salmon	Oncorhynchus kisutch
Sockeye salmon	Oncorhynchus nerka
Chinook salmon	Oncorhynchus tshawytscha
Saffron cod	Eleginus gracilis
Starry flounder	Platichthys stellatus
Sandlance	Amrodytes hexapterus
Sturgeon poacher	Agonus acipenserinus
Threespine stickleback	Gasterocteus aculeatus
Ninespine stickleback	Pungitius pungitius
Tubenose poacher	Pallasina barbata aix
Whitespotted greenling	Hexagrammus stelleri
Yellowfin sole	Limanda aspera

Addendum 2. Studies conducted within the Norton Sound - Port Clarence-Kotzebue districts, 1982.

Special Studies

1. Kwiniuk River salmon counting tower
   a) Location:
   About five miles upstream from the mouth of the Kwiniuk River in Norton Sound.

   b) Objectives:
   Determine daily and seasonal timing and magnitude of chum and pink salmon runs. Determine age, sex and size of chinook and chum salmon of the commercial harvest at buying facilities at Moses Point.

   c) Results:
   An unexpanded total of 138 chinook, and an expanded total of 462,767 pink and 43,521 chum salmon was counted passed the tower. Both chum and pink salmon escapements were the second highest ever documented.

2. Unalakleet salmon studies
   a) Location:
   Unalakleet River

   b) Objectives:
      1) To maintain an index of salmon migration up the Unalakleet River through the use of gillnets and to apportion species composition of the run.
      2) To test the feasibility of using sonar counters on the Unalakleet River to enumerate the various runs.

   c) Results:
   The chinook salmon run peaked on June 18-25, coho salmon on July 30-August 1, pink salmon on July 8-10, and chum salmon on June 26-28, July 8-11, and July 24-30. The predominany age class, by the Gilbert-Rich aging method, for each species was: king salmon 4 , chum salmon 4 , pink salmon 2 , and coho salmon 4 .

   d) Unalakleet results:
      1) Using the three day sample periods, the test net catch had the following composition: 0.1% chinook, 1.3% coho, 3.3% chum, 89.8% pink salmon, and 5.6% miscellaneous species.

2) The sonar counter gave a final total of 6,814,351 fish. The escapement for the Unalakleet River was found to be 7,586 chinook, 91,814 coho, 6,119,155 pink, 223,913 chum and 371,883 other.

3. Subsistence fishing surveys
   a) Locations:
      Norton Sound, Port Clarence, and Kotzebue districts.
   b) Objectives:
      Determine subsistence utilization of salmon for formulating management procedures and goals.

   c) Results:
      A total of 551 families were surveyed by door-to-door interviews and catch calendars. Their catches totaled 1,353 chinook, 418 sockeye, 18,109 coho, 61,292 pink and 54,002 chum salmon for a combined total of 135,174 salmon.

4. Commercial catch sampling
   a) Location:
      Norton and Kotzebue Sounds.
   b) Objective:
      Obtain age, sex and size information for commercially caught salmon, king crab, and herring.

   c) Results:
      More than 11,000 salmon, king crab and herring were sampled in 1982. This data has been analyzed and presented in separate reports.

5. Stebbins/St. Michaels stream inventory
   a) Location:
      The area between Norton Sound subdistrict 6 and Apoon mouth of the Yukon River.
   b) Objectives:
      To determine which streams have salmon runs and the magnitude of those runs.
   c) Results:
      Aerial surveys were flown on most of the salmon producing streams in the study area. The aerial survey of the Pikmitalik River, on July 8, counted seven chinook, 12,660 pink, and 2,272 chum salmon; the Kogak River on July 8, had 4,840 pink and 740 chum salmon; the Pastolik River survey, on July 17, showed 28,500 pink salmon. Ground surveys were made in the St. Michaels canal area. Poor weather conditions eliminated the planned ground survey of the Pastolik River and the aerial surveys for coho salmon.

6. Noatak River Escapement
   a) Location:

Lower Noatak River near Kotzebue

b) Objectives:
Conduct a sonar operation in the lower Noatak River to determine salmon escapement.

c) Results:
A total of 92,364 chum salmon were counted by sonars operated from each bank of the Noatak River.

7. Kotzebue Stock Separation

a) Location:
Kotzebue Sound and Hotham Inlet near Kotzebue.

b) Objectives:
To determine the temporal and spatial differences between Kobuk and Noatak River chum salmon stocks when they are passing through the Kotzebue commercial fishing district.

c) Results:
A total of 4,931 chum salmon were tagged from July 1 through August 25. A total 1,255 salmon tags were recovered either from the commercial and subsistence salmon fisheries or department spawning ground surveys.

8. Squirrel River salmon counting tower

a) Location:
On the lower Squirrel River, a tributary of the Kobuk River, about 30 miles east of Kotzebue.

b) Objectives:
Determine daily and seasonal timing and magnitude of chum and pink salmon runs in this stream.

c) Results:
An unexpanded total of 144 pink salmon and an expanded total of 9,500 chum salmon were observed passing the tower during 1982. Since this is the first year of this project comparisons with other years are speculative but the run appeared to be average in both seasonal magnitude and timing.

9. Norton Sound King Crab population index

a) Location:
Norton Sound

b) Objectives:
To index the king crab population in Norton Sound determining the relative abundance of size classes, determining distribution of crab, and tagging and releasing male crab to obtain information on growth, migration, and allow for a population estimation to be made, based on the mark and recapture method.

c) An area of over 4,000 square miles was fished. There were 689 pots lifted, capturing 1,636 legal males, 4,230 undersized males, and 351 females. A total of 337 legal males and 160 undersized males were

tagged and released. After the commercial fishing season, based on the mark and recapture method, a population estimate of 1.6 million pounds of legal male king crab was predicted to be in Norton Sound at the beginning of the 1983 season.

10. Near-shore winter king crab tagging study
    a) Location:
    Ocean waters of Norton Sound 1 to 2.5 miles south of Nome.
    b) Objectives:
    To determine migration patterns of crab that are close to shore during the winter. Also to evaluate the effectiveness of the "15 mile summer commercial crab closure" in protecting inshore crab; to obtain basic life history data.
    c) Results:
    A total of 60 pots were pulled, capturing 246 male and 10 female king crab. Of the 246 male crab, 199 were tagged and released.

11. Herring Test Fishing
    a) Location:
    Norton Sound ocean waters; camps located at Klikitarik and Cape Denbigh, and Unalakleet.
    b) Objectives:
    To determine age class composition of the Norton Sound herring run through test fishing with variable mesh gillnets. Also spawning areas were mapped along with the monitoring of the spawn on kelp fishery.
    c) Results:
    Gillnets were operated from May 22 through June 27. Scale analysis has been completed and the results are listed in Table .

ADDENDUM 3. EMERGENCY ORDERS AND REGULATIONS PROMULGATED DURING 1982.

Emergency Order Number Norton Sound	Effective Date	Action Taken	Comments
3-Z-01-82	June 7	Closed subdistrict 2, from Spruce Creek to Junction Creek, to commercial herring fishing.	Fishing effort and harvest were concentrated in this subdistrict, with muddy waters making biomass estimates impossible. Closure resulted in disbursal of effort and better distribution of harvest throughout Norton Sound.
3-Z-02-82	June 8	Closed subdistrict 1, all waters south of the latitude of Spruce Creek, to commercial herring fishing.	Conservation of herring stocks required a closure of this area until further biomass estimates could be made. Harvest approaches 20% of estimat biomass.
3-Z-03-82	June 9	Closed spawn on kelp harvest in subdistrict 1 waters open to commercial harvest, Canal Point Light to Wood Point.	Strong commercial sac roe herring harvests in subdistrict 1 resulted in a harvest of 26% of the observed biomass which was in excess of the 10-20% management objective. No further exploitation of any kind was warranted on subdistrict 1 herring stocks.
3-Z-04-82	June 10	Closed subdistrict 3, from Island Point to Junction Creek, to commercial herring fishing.	This closure was initiated in order to assess the harvest and prevent overexploitation.
3-Z-05-82	June 10	Re-opened subdistrict 3, from Island Point to Junction Creek, to commercial herring fishing. Rescinds E.O. 3-Z-04-82.	Current biomass estimates indicated that an additional 300 m.t. could be harvested without exceeding a 20% exploitation rate.

ADDENDUM 3. EMERGENCY ORDERS AND REGULATIONS PROMULGATED DURING 1982.

Emergency Order Number Norton Sound	Effective Date	Action Taken	Comments
3-Z-06-82	June 15	Re-opened subdistrict 1 waters west of the longitude of Wood Point to commercial taking of herring spawn on kelp. Rescinds E.O. 3-Z-03-82.	Documentation of an additional 2 miles of spawn in the St. Michael's Bay area and the arrival of new fish lowered the exploitation rate on sac roe herring from 26% to 23%. A limited harvest of spawn on kelp was warranted in subdistrict one waters open to the commercial harvest of spawn on kelp.
3-Z-07-82	June 17	Opened all Norton Sound subdistricts to commercial salmon fishing for one 24 hour period.	The Departments' test net in Unalakleet River and the subsistence fishermen initially began catching king salmon on June 10. Chum salmon are also usually available in Norton Sound in sufficient numbers to support commercial harvest by mid-June. Fishing time to be further adjusted in each subdistrict based on run strength and timing as well as fishing effort.
3-Z-08-82	June 21	Opened subdistricts 1,2, 4,5, and 6 to commercial salmon fishing 4 days a week. Rescinds E.O. 3-Z-07-82.	Catch and escapement data for previous years showed that salmon are present in sufficient numbers to be commercially harvested in Nome, Golovin, Norton Bay, Shaktoolik, and Unalakleet by June 21.
3-Z-09-82	June 21	Opened commercial salmon fishing in subdistrict 3, Moses Pt., to two 24 hour periods a week.	The returning chum salmon for this year were the progeny of 1977-1979 brood years. The majority of the returning chum are expected to be progeny of the 1978 brood year, which produced a below average escapement of 15,000 chum. Fishing time will be adjusted throughout the season to achieve the minimum escapement goal of 7 000 in the Kwiniuk River.

ADDENDUM 3 . EMERGENCY ORDERS AND REGULATIONS PROMULGATED DURING 1982.

Emergency Order Number Norton Sound	Effective Date	Action Taken	Comments
3-Z-10-82	June 28	Increased commercial fishing time in the Moses Pt. subdistrict from two 24 hour periods to one 2 day and one 3 day period a week. Rescinds E.O. 3-Z-09-82	The Department counting tower on the Kwiniuk River of the Moses Pt. subdistrict indicated that an above average chum escapement would probably occur even with increased commercial harvest.
3-Z-11-82	June 29	Closes the Nome subdistrict to commercial salmon fishing. Rescinds E.O. 3-Z-08-82	The Alaska Board of Fisheries set a commercial harvest guideline at 5-15 thousand chum salmon for the Nome subdistrict. On June 28, 10,970 chum and 803 pink salmon had been harvested. Aerial surveys have documented very poor chum salmon escapement in Nome subdistrict streams. Pink salmon also had not begun their migration into Safety Sound streams. This subdistrict was closed to commercial salmon harvest to insure adequate escapement for subsistence use and reproductive requirements.
3-Z-12-82	July 5	Re-opened subdistrict 1 waters to commercial salmon fishing with gillnet mesh size restrictions of 4 1/2 inches or less. Fishing periods were two 48 hour periods a week.	Aerial surveys showed that pink salmon were entering Nome area streams. Department counting towers, sonar, test nets, and commercial catch statistics indicated a building pink salmon run in Norton Sound. In order to harvest surplus pink salmon without overharvesting chum salmon stocks,a mesh restriction of 4 1/2 inches or less was in effect during the two 48 hour period per week.

ADDENDUM 3 . EMERGENCY ORDERS AND REGULATIONS PROMULGATED DURING 1982.

Emergency Order Number Norton Sound	Effective Date	Action Taken	Comments
3-Z-13-82	July 7	Provided two additional commercial fishing periods in subdistricts 2,4,5, and 6, with gillnet mesh size restrictions of 4 1/2 inches or less. These openings provided an additional 36 hours of fishing a week in order to harvest more of the strong pink run.	Department counting towers, sonar, test nets and commercial catch statistics indicated that the pink salmon run throughout Norton Sound was underway and strong. In order to harvest surplus pink salmon without overharvesting chum salmon, gillnets used during these periods were restricted to 4 1/2 inch mesh or less.
3-Z-14-82	July 7	Increased commercial fishing time in the Moses Pt. subdistrict from 5 days per week to one 6 day period per week. Rescinds E.O. 3-Z-10-82.	The Department counting tower on the Kwiniuk River had counted 21,361 chum and 138,269 pink salmon. Using comparative escapement data, above average chum and pink escapement would occur in this subdistrict even if the commercial harvest was increased.
3-Z-15-82	July 7	Extended the July 7-July 9 commercial fishing period in the Nome subdistrict to July 10. Rescinds E.O. 3-Z-13-82.	Commercial salmon fishing in the Nome subdistrict was hampered by poor weather conditions during the previous two periods, with the last delivery made on June 26. Because commercial fishing effort and catch had been minimal during the last two periods and because pink salmon were present in large numbers, the period was extended.

ADDENDUM 3. EMERGENCY ORDERS AND REGULATIONS PROMULGATED DURING 1982.

Emergency Order Number Norton Sound	Effective Date	Action Taken	Comments
3-Z-16-82	July 17	Increased subsistence salmon fishing time in the Nome subdistrict from 4 days a week to 7 days a week.	The majority of Nome subdistrict streams had excellent pink salmon escapement with pinks continuing to enter the river systems.
3-Z-17-82	August 1	Removed the "pink gear only" periods in the Golovin, Koyuk, Shaktoolik, and Unalakleet subdistricts. Rescinds E.O. 3-Z-15-82	Commercial catch statistics, Department countir towers, test nets, and sonar counts indicated that the bulk of the pink run had entered the river systems. Since most of the pink run had already passed through the commercial fishery, the special "pink gear only" periods were remov
3-Z-18-82	August 2	Decreased commercial fishing time in the Moses Pt. subdistrict from 6 days to 4 days a week. Rescinds E.O. 3-Z-14-82	Commercial fishing time was increased in the Moses Pt. subdistrict during the strong chum and pink salmon runs. Daily escapement counts on the Kwiniuk River tower showed that the chum and pink runs were over. A fishing schedule of two 48 hour periods a week was initiated in August to prevent overexploitation of the coho salmon resource.
3-Z-19-82	August 7	Re-established the normal 4 day a week fishing schedule for Nome subdistrict subsistence fishermen. Rescinds E.O. 3-Z-16-82.	Subsistence salmon fishing time was increased in the Nome subdistrict during the strong pink salmon run. By August 7 the major part of the pink run had entered the river systems and begun spawning. Coho salmon had begun their upstream migration and are less numerous than pink salmon. To prevent overexploitation and insure sufficient escapement of coho salmon, a fishing schedule of two 48 hour periods a week was resumed

ADDENDUM 3 . EMERGENCY ORDERS AND REGULATIONS PROMULGATED DURING 1982.

Emergency Order Number Norton Sound	Effective Date	Action Taken	Comments
3-Z-20-82	August 19	Increased commercial fishing time in the Norton Bay, Shaktoolik, and Unalakleet subdistricts from 4 days to 5 days a week.	Commercial catch statistics showed that Eastern Norton Sound was experiencing a record silver salmon run. Test net and sonar data indicated that excellent silver salmon escapement was occuring, and further harvest would not damage silver salmon stocks. Therefore, commercial fishing time was increased in subdistricts 4,5, and 6.
3-Z-21-82	August 19	Extended the August 19 commercial fishing period from 24 to 48 hours in length in the Nome subdistrict. Rescinds E.O. 3-Z-20-82.	Due to poor weather conditions, Nome subdistrict fishermen had not been able to fish the last 2 periods. To compensate for one week of lost fishing time, the July 19 commercial period was extended from 24 to 48 hours.
3-Z-22-82	August 26	Changed the area closed to summer commercial king crab fishing by moving the closed area line between 167° W. Long. and 163° W. Long. 5 miles north to 64° 20' N. Lat.	The Alaska Board of Fisheries set an Optimum Yield for the Norton Sound summer king crab fishery at 20% of the legal male population. They also voted to continue a nearshore area closure approximately 15 miles from the shores of the Southern Seward Peninsula. However, under the Boards direction, the closed area line was to be relaxed in "small increments" if the optimum yield could not be efficiently obtained. By August 25, only 125,000 pounds of the allowable 500,000 pounds was harvested. At that rate a 20% exploitation rate would not be reached by the end of the season. Therefore, on August 26 the area closed to summer commercial king crab fishing was reduced by 5 miles.

ADDENDUM 3 . EMERGENCY ORDERS AND REGULATIONS PROMULGATED DURING 1982.

Emergency Order Number Norton Sound	Effective Date	Action Taken	Comments
3-Z-23-82	August 30	Extended the closing date for the Norton Sound commercial salmon fishery from August 31 to September 1.	The commercial salmon season in the Norton Sound District ends by regulation on August 31. However the season closing date was extended to September 1 because the coho run was strong and to allow for normal scheduling of the period.
3-Z-24-82	September 2	Extended the commercial salmon season in the Norton Bay, Shaktoolik, and Unalakleet subdistricts for one 48 hour period to end September 4. Rescinds E.O. 3-Z-23-82.	Department test net catches and sonar counts as well as comparative commercial catch statistics showed that Southeastern Norton Sound had experienced a record silver salmon run. Although the silver run had begun to taper off, there was still enough fish present to support further commercial harvest, with above average escapement having already occured. For these reasons, the Norton Bay, Shaktoolik, and Unalakleet subdistricts were extended for one additional 48 hour period.

ADDENDUM 3 . EMERGENCY ORDERS AND REGULATIONS PROMULGATED DURING 1982.

Emergency Order Number Kotzebue	Effective Date	Action Taken	Comments
3-X-01-82	July 8	Opened the Kotzebue District commercial salmon fishery on July 8 for a 24 hour period.	The commercial salmon season opened in the Kotzebue district by regulation on July 10. To allow for normal scheduling and comparable catch statistics, the fishery will begin on July 8. Periods were intitially set at two 24 hour periods per week.
3-X-02-82	August 4	Increased commercial fishing time in the Kotzebue District from two 36 to two 48 hour periods per week.	Comparative commercial catch statistics indicated an above average chum run. By early August, Noatak River stocks are dominant in the fishery, and the Noatak River does not sustain a large subsistence harvest. Due to the apparent strength of the run, increased commercial harvest would not jeopardize Noatak River drainage escapement goals. Fishing time was increased to 4 days a week.
3-X-03-82	August 30	Decreased the last commercial and fishing period in the Kotzebue District from 48 to 24 hours.	Commercial fishing ends by regulation on August 31. To allow for the normal scheduling of the period and provide for public safety, the last open commercial fishing period in the Kotzebue District ended 6:00 PM August 31.

ADDENDUM 4. Norton Sound-Kotzebue Sound processors and associated data, 1982.

Commercial Operator	Product	District
Alaska Sea-Fare, Inc. Anchorage, Alaska	Fresh salmon coho	Norton Sound
A. Kemp Fisheries, Inc. Box 6506 Duluth, Mn. 55806 m/v Bering Trader m/v Marla Jo m/v Seldovia	Herring	Norton Sound
All Alaskan Seafoods, Inc. 101 Marine Way Kodiak, Ak. 99615 m/v All Alaskan	King crab	Norton Sound
Arctic Command Partnership 100 2nd Ave. Edmonds, Wa. 98020 m/v Arctic Command	King crab	Norton Sound
Arctic Fish Co. 2360 W. Commodore Way Box 99008 Seattle, Wa. 98199	Fresh salmon chum Fresh Char	Kotzebue
Commercial Fishermen Box 193 Kotzebue, Ak. 99752	Fresh salmon chinook chum pink Fresh Char	Kotzebue
Denali Seafoods Box 17703 Seattle, Wa. 98107 m/v Denali	Herring	Norton Sound
Elim Fish Processing Co-op Elim, Ak. 99739	Fresh salmon chinook chum coho pink	Norton Sound

ADDENDUM 4 . Norton Sound-Kotzebue Sound processors and associated data, 1982. (continued).

Commercial Operator	Product	District
Golovin Fish Processing Co-op Golovin, Ak. 99762	Frozen salmon chinook chum coho pink	Norton Sound
Icicle Seafoods, Inc. . Bering Star 4241 21st W. Seattle, Wa. 98199 m/v Bering Star m/v Viking Queen m/v Andronica m/v Mitrofania m/v Invader m/v Teresa Marie	Herring	Norton Sound
Kotzebue-Norton Sound Dev.Co.,Inc. 520 Northern Federal Building 386 Wahasha St. St. Paul, Mn. 55102 (Norton Sound Fishermen's Co-op)	Frozen salmon chinook chum coho pink	Norton Sound
KSF Seafoods - WF P.O. Box 117 Unalakleet, Ak. 99684 m/v Quiet Sea	Herring roe on kelp Fresh salmon chinook chum coho pink	Norton Sound
Mokuhana Fisheries Box C-99308 2360 W. Commodore Way Seattle, Wa. 98199 m/v Mokuhana	Frozen salmon chinook chum pink Fresh Char	Kotzebue
NANA Development Corp. DBA NANA Seafoods Box 49 Kotzebue, Ak. 99752	Fresh salmon chinook chum pink Fresh Char and Sheefish	Kotzebue

ADDENDUM 4. Norton Sound-Kotzebue Sound processors and associated data, 1982. (continued).

Commercial Operator	Product	District
Nome Business Ventures Box 880 Nome, Ak. 99762	Frozen salmon chinook chum coho Frozen Arctic char smelt herring white fish Dried salmon chum pink	Norton Sound
Northwind Fisheries, Inc. 3005 1st Ave. Suite 200 Seattle, Wa. 98121 m/v Skipladner m/v Shashildan m/v Prowler	Herring	Norton Sound
Offshore Fisheries, Inc. 3601 Gilman Ave. W. Seattle, Wa. 98119 m/v Alaskan Enterprise m/v Express m/v Westward Wind m/v Arctic Dreamer m/v Cordova m/v Arctic Producer m/v Northwest Enterprise	Herring King crab	Norton Sound Norton Sound
Steuart Seafoods 1520 Norton Avenue Everett, Wa. 98201	Fresh salmon king chum pink	Norton Sound
Swiftsure Fisheries, Inc. 200 W. Thomas St. Seattle, Wa. 98119	Fresh salmon chinook Chum Pink Fresh Char	Kotzebue

ADDENDUM 4. Norton Sound-Kotzebue Sound processors and associated data, 1982. (continued).

Commercial Operator	Product	District
Trident Seafoods Corp. 5355 28th Ave. N.W. Seattle, Wa. 98107 m/v Billikin m/v Bountiful m/v Amatuli m/v Tempest m/v Viking Explorer	Herring	Norton Sound
Whitney-Fidalgo Seafoods 2360 W. Commodore Way Box 99008 Seattle, Wa. 98199 m/v Yardarmknot m/v Totem m/v Cirus m/v Midas m/v Donna Marie m/v Yardarm Knot m/v Midas	Herring Fresh frozen salmon	Norton Sound Norton Sound
C.J. Phillips - Nome	Fresh salmon chinook chum pink Fresh Char	Kotzebue